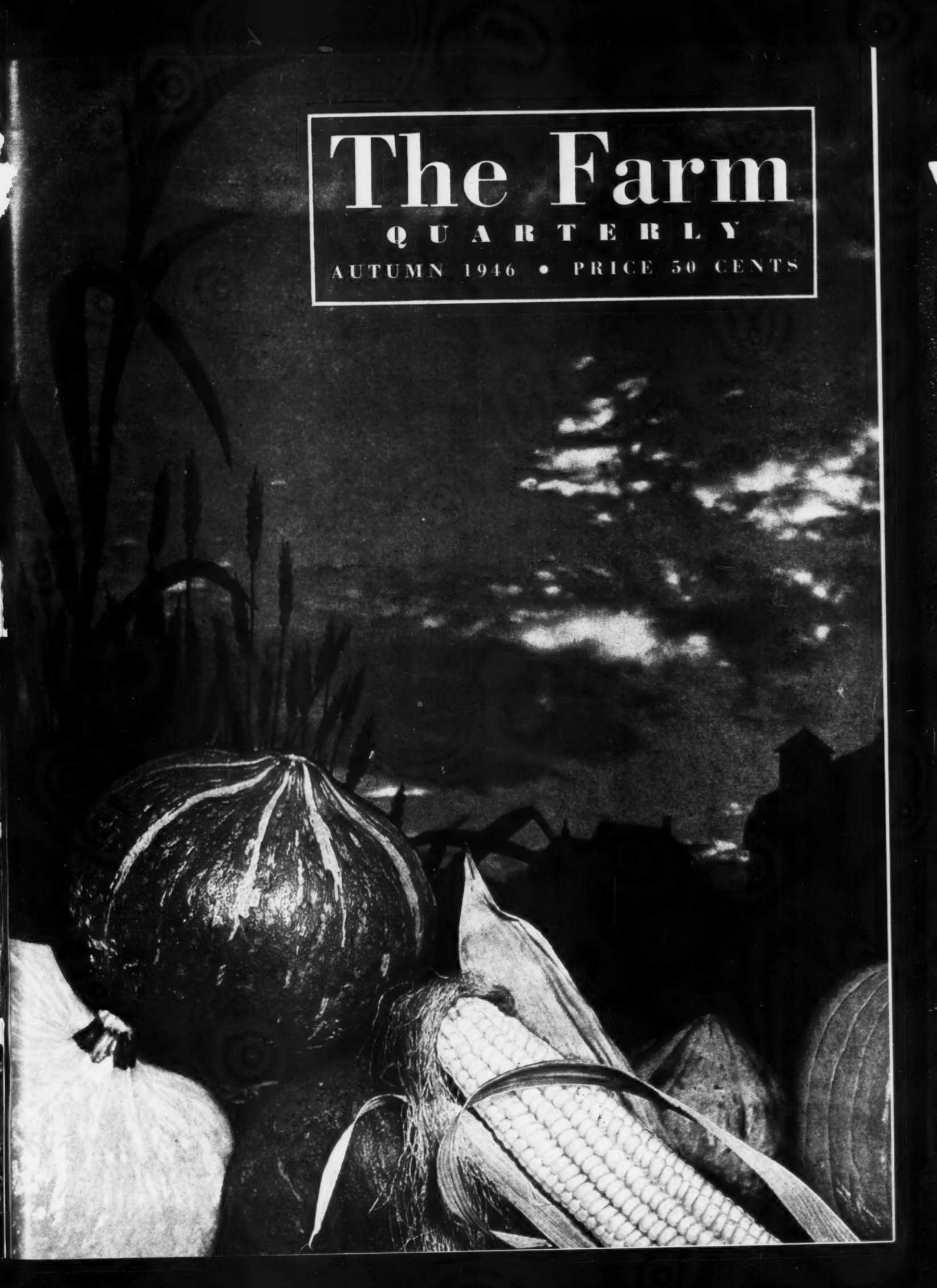


The Farm

QUARTERLY

AUTUMN 1946 • PRICE 50 CENTS

Painted for NBC by Lou Harold

Service to Youth
Is service to the America that is today
And is to be tomorrow.

To an alert Young America—in classroom . . .
Clubroom . . . in city group or country grange—
Radio serves with information no less than entertainment.

Each Saturday, NBC broadcasts its famous rural institution, The National Farm and Home Hour, over its network of independent affiliated stations. Matters concerning such groups as the 4-H Club and the Future Farmers of America are featured often on this program designed for the great agricultural audience.

AMERICA'S NO. 1 NETWORK

NBC

A SERVICE OF RADIO CORPORATION OF AMERICA

. . . the National Broadcasting Company

What's Coming in the FARMALL *System?*

AUTUMN on the farm. Another summer is ended, and Nature lays things by for winter.

Now for 1947. What's ahead? Will the long-promised new equipment reach the farm in ample supply for all?

Everybody at International Harvester is working toward that end. Unless new complications arise, your dealer under the IH sign should have the tractors and machines you need, in time for another spring.

Our factories are turning out the 4 Farmalls—A, B, H and M—and the ever-increasing variety of pull-behind and mounted equipment that makes the *FARMALL SYSTEM.*

The new Farmall CUB, eagerly awaited on thousands of small farms, will take longer to deliver. The Cub is now scheduled for quantity production next summer.

Among other new International products are these: Self-Propelled Combines . . . One-Man Pickup Hay Balers . . . Mechanical Cotton Pickers . . . Spreaders for Fluid Manure . . . New Side Delivery Rakes . . . Dry and Green Hay Choppers . . . Power Loaders . . . Smaller Balers, Combines, Corn Pickers . . . Cut-Off Corn Pickers . . . Sugar Beet Harvesters . . . Touch Control Development . . . Home Freezers and Refrigerators.

Some of these are coming off the assembly lines now—others await the completion of new factories. *Your* contact is the International Dealer. Let him know your needs.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Tune in "Harvest of Stars" every Sunday—NBC Network. See newspapers for time and station.

HOLD THAT SOIL!

Save the thin layer of soil in which your living is rooted. If erosion is a problem in your fields, join in the great modern drive to control it. See the supervisors of your local soil conservation district or your county agent for cooperation in a terracing, contouring and strip-cropping program . . . FARMALL Tractors and Equipment are designed for FARMING ON THE CONTOUR.

INTERNATIONAL HARVESTER

Plan Ahead with "FARMALL"
Look to INTERNATIONAL HARVESTER

Speaks for itself...

SPEEDWAY
DE LAVAL
1 Fast-Milking Comfort Teat Cups
2 Sanitary, long-life rubber parts
3 Speedway Pulsator—one moving part
4 Sanitary, Fast-Flow milk claw
5 Easy "hook-on" for Teat Cups
6 Check valve bars foreign matter
7 Easy-to-clean operating top
8 Handle shaped for easiest use
9 Stainless steel bail—no rivets
10 Rugged, bright stainless steel pail
11 Heavy rim keeps bottom off floor
12 Easy-pour handle—keeps hands clean

THE DE LAVAL MAGNETIC SPEEDWAY Milker Unit

THE VETERINARIAN'S CORNER

THE MILK "LET-DOWN"

The second phase of milk secretion is the "let-down" of milk already formed in the udder. The manner in which milk is "let down" has caused considerable speculation. Although many theories have been advanced in the past on how to milk cows for the best results, it has been only recently that a clear picture has been given for an understanding of the importance of proper milking and the factors that will influence "let-down" by the way a cow is milked.

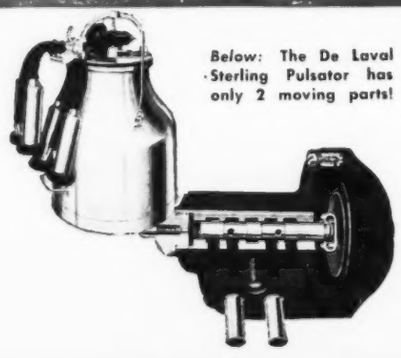
Actually what happens is that a cow conditions herself to be milked by what she hears and sees at milking time. The noise of milk pails, the milker pump or other sounds associated with milking time will prepare her for milking. When the teats and udder are manipulated while being wiped, a message is flashed to the brain, resulting in a hormone being liberated into the blood stream, which causes a contraction of the mammary gland musculature to force the milk out of the millions of tiny recesses into the larger channels and sinuses of the udder. The udder then becomes firm and distended due to a high intraglandular pressure and many cows that are easy milkers will leak milk.

Under normal circumstances cows like to be milked. If conditions are present that they dislike it will interfere with their proper milking. There are many factors that will distract a cow's attention; namely strange noises, strangers, strange objects or anything unusual that will attract the cow's attention. It has been said that under such circumstances a cow holds up her milk. This is not true—she has failed to let it down. This condition is liable to occur at any time when a cow is suspicious of her milker or surroundings.

—DR. GEO. H. HOPSON
De Laval Veterinarian
and Milk Sanitarian

... AND YOU SHOULD KNOW THE FACTS ABOUT THE PROFITABLE DE LAVAL STERLING MILKER!

Thousands of De Laval Sterling Milker users are doing a clean, fast and *profitable* job of milking. The famous Sterling Pulsator *has only two moving parts.* It provides precise, snappy milking action . . . real De Laval quality milking at lower cost. Complete De Laval Sterling Milker Outfits or single or double units for De Laval Better Milking on your present milker single pipe line installation.



Below: The De Laval Sterling Pulsator has only 2 moving parts!

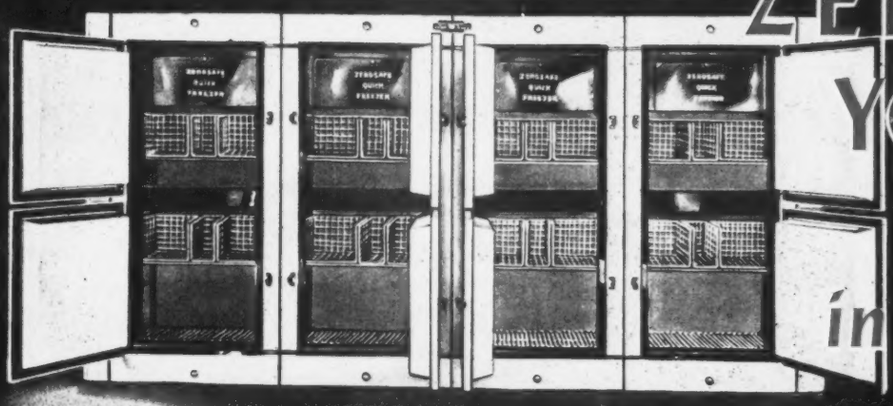
THE DE LAVAL SEPARATOR COMPANY

NEW YORK 6
165 BROADWAY

CHICAGO 6
427 RANDOLPH ST.

SAN FRANCISCO 19
61 BEALE ST.

ZEROSAFE YOUR FOOD and be FIRST in REAL LIVING



Wilson ZEROSAFE Farm Freezer
Sectional Model FF-120

SINCE 1939 HUNDREDS OF ZEROSAFE OWNERS HAVE FROZEN AND STORED THEIR OWN FRESH FOODS FOR DAILY YEAR-AROUND USE

You too can live the Zerosafe Fresh-Food way . . . Have better food, more food, and more time for living . . . Banish food worries and kitchen drudgery . . . Live healthfully . . . Entertain graciously any number of guests, expected or unexpected.

Winter and Summer, ZEROSAFE Fresh-Food is always within instant reach in the quantities you need for every meal.

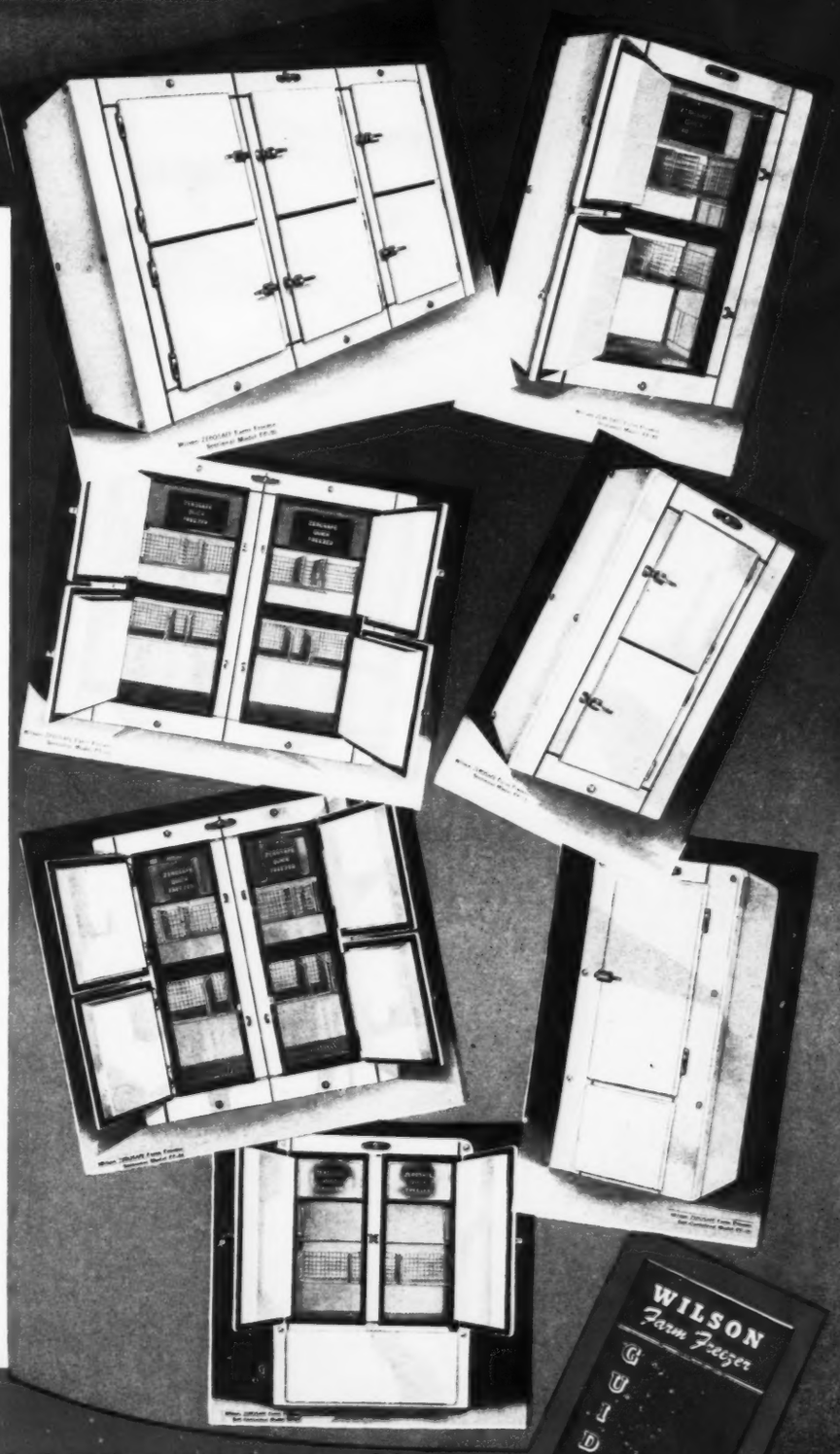
The truly TIME-TESTED ZEROSAFE, the only Reach-In Farm Freezer proved by years of use to have rugged efficiency, durability and the capacity necessary for freezing and storing adequate supplies of food, is unexcelled in real usability and modern convenience.

ZEROSAFE has all the features which ONLY YEARS OF EXPERIENCE can provide, plus the SIZE (from 15 cu. ft. to 120 cu. ft.) necessary to make your family FIRST IN REAL LIVING.

ZEROSAFE IS THE FIRST AND ONLY TRULY ADEQUATE REACH-IN FARM FREEZER. It is the product of Wilson Cabinet Company, Inc., pioneers in developing the upright freezer design in sizes large enough for full use.

HERE'S TO YOUR BETTER LIVING!

For your use, with our compliments: "The Wilson Farm Freezer Guide", a modern 40-page booklet on all phases of freezing and storing foods. Invaluable to any user or prospective user of a farm freezer. To get your free copy, send your name and address today to Dept. 51.



WILSON REFRIGERATION, INC.

DIVISION WILSON CABINET COMPANY, SMYRNA, DELAWARE

Every Week 10,000 More Cows Get Surge Milking!

That's because their owners want a milking machine that does all the work . . . a machine that does automatically what other machines have to be helped to do . . . a machine that holds the teat cups down where they belong so the passageways remain open and the milk can run out freely.

More and more men are buying the Surge because their neighbors are getting more milk and saving more time since they changed to a Surge. Your Surge using neighbor can tell you more and show you more than we can in this short advertisement . . . it will pay you well to ask him about the Surge . . . and about Surge Service that stands back of each Surge outfit.

Your Surge Service Dealer Makes Your Surge Milker Worth More Money

BABSON BROS. CO., Dept. 279-6, 2843 W. 19th St., Chicago

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Use the COUPON

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Dept. 279-6, 2843 W. 19th St.,
Chicago 23, Illinois

*Name*_____ *R.F.D.*_____
*Town*_____ *State*_____

To Get the Full Story about Money Making Milking

Farm's Pictures

The following list, page by page, shows the source of each picture in this issue. When more than one source is represented on a single page, credit starts at upper left to right, top to bottom.

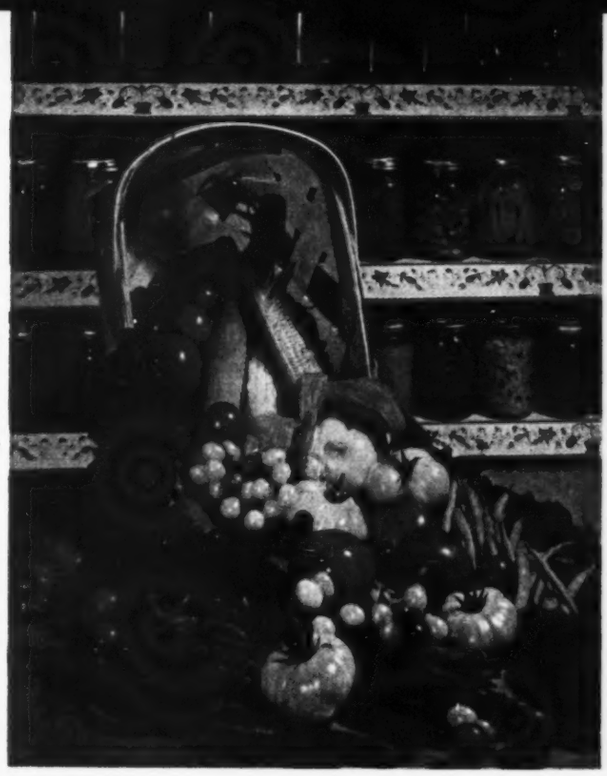
Cover by Michael R. Cubitt

5—Bond-*Guillumette*. 6—Joe Munroe. 12—Winston Pote-*Shostal*. 13 through 15—Joe Munroe. 16—Herb McLaughlin. 17-18—Joe Munroe. 19—Joe Munroe; USDA. 20—Ray Atkeson; War Food Administration—USDA. 21—Godfrey Lundberg 22 through 27—Herb McLaughlin. 28—Glenn Adams. 29—USDA. 30—Joe Clark. 31—Georgia Engelhard 32—Carl Mansfield. 33-34—Joe Munroe. 35—Lillian Green—*Shostal*. 36 through 40—Joe Munroe. 41—Jacob Lofman—*Pix*. 42—Nancy Hull. 43—Joe Clark; Joe Clark; Wm. M. Rittase. 44—C. C. Tisler; Joe Clark; George C. Pace. 45—Ewing Galloway; Parks-Standard Oil Co. (N. J.) 46—Jacob Lofman—*Pix*. 47—Herb McLaughlin. 48—USDA—Madeleine Osborne. 49—Godfrey Lundberg; Pace—*Monkmeyer*. 50—Co-op Grain Quarterly. 51—Joe Munroe. 52—USDA—Ackerman. 53—Carl Mansfield. 54—Ray Atkeson. 55—Purina Research Farm. 56—J. W. McManigal. 57—Charles A. Reese. 58-59—Watson—*Monkmeyer*. 60—Ewing Galloway. 61—Roman Vishniac—*Guillumette*. 62—Roy Pinney—*Black Star*. 63—H. Armstrong Roberts. 64—Winston Pote—*Shostal*. 65—Richard Mathers. 66—USDA—Forsythe; P. Thos. Ziegler. 67—Carl Mansfield. 68—J. W. McManigal; P. Thos. Ziegler. 69-70—P. Thos. Ziegler. 71—USDA—Knell. 72—H. Armstrong Roberts. 73-74—Univ. of Minn. Laboratory. 75—Tet Borsig. 76—Cincinnati Chemical Works. 77—Joe Munroe. 78—USDA—Forsythe; USDA—Madeleine Osborne. 79 — USDA — Forsythe. 80—USDA—Knell; Herb McLaughlin. 81—Fred Knoop. 82-83—E. L. Gockeler—*Guillumette*. 84—Ray Atkeson. 86—Kosti Ruohomaa—*Black Star*. 88-89—Kosti Ruohomaa—*Black Star*. 90—Library of Congress. 91—Kosti Ruohomaa—*Black Star*. 92—Robert Bagby—*FPG*. 93—Louis C. Williams; Kosti Ruohomaa—*Black Star*. 94—Kosti Ruohomaa—*Black Star*.95—Louis C. Williams. 96-97—Kosti Ruohomaa—*Black Star*. 98—Robert T. Hayes. 100-101 — Fred Knoop. 102-103 — Joe Munroe. 104-105—Fred Knoop. 106—Auk. 107-108—Carl Mansfield. 109—Carl Mansfield; J. F. Bennett. 110—Herb McLaughlin.

The selections from *"Pleasant Valley"* appearing on pages 33-41 are from the book of that title, published by *Harper Bros.*, N.Y.C.

THE FARM QUARTERLY
22 East 12th St., Cincinnati 10, Ohio

R. J. McGinnis.....**Editor**
Fred Knoop.....**Managing Editor**
Robert T. Hayes.....**Art Editor**
Mary Berluti.....**Editorial Secretary**
Wm. D. Zaeh.....**Production Manager**
Aron M. Mathieu.....**Business Manager**



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Contributing Editors: **Ray Dunn, Ralph Kenney, Robert Graham, Dave Roberts, Charles A. Reese, Banner Bill Morgan, George D. Scarseth, Myron S. Hazen, B. J. Killham, J. W. Schwab, Charles Krutch, Virgil Overholt, Katharine A. Smith, E. B. Powell, B. G. DeWeese, G. W. Salisbury, J. E. McClintock.**

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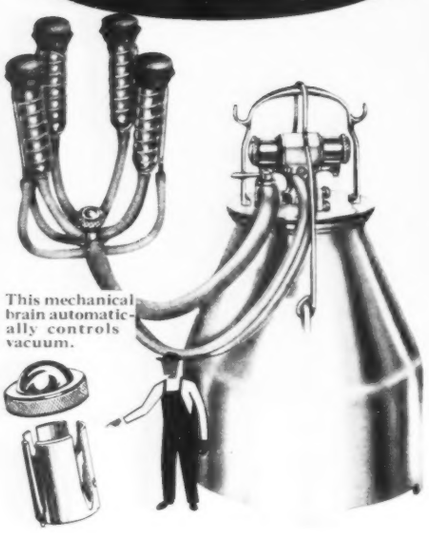
Exclusive
WITH THE
MILK-MASTER
VARI-MATIC MILKING



This mechanical brain automatically controls vacuum.

Automatic Variation of Vacuum to Fit the Need of Each Teat!

No two cows milk alike. But for maximum production, each cow must be milked fast with comfort. This calls for individual fitting of milking action . . . enough vacuum for teats hard-to-milk . . . reduced vacuum for those that milk out easily. You get this kind of milking, *Vari-matic milking* only with the Milk-Master. It saves time, saves money, increases profit.

IT'S FREE!
Write for reprint of Dr. W. E. Petersen's article "The Cow's Udder—It's Function and Care."

Note these features!

★ PULL-MORE INFLATIONS
The air control top provides a stimulating tug and pull on the teat.

★ VIS-A-FLOW OBSERVATION
Plastic dome on transparent connection permits constant check on milk flow.

★ HELIX-RIB TEAT CUP SHELLS
Helix-rib construction.

★ MECHANICAL BRAIN
Connected to the inflation cup cluster it controls vacuum automatically.

Perfection
MILK-MASTER
PERFECTION MANUFACTURING CORPORATION
2100 E. HENNEPIN AVENUE, MINNEAPOLIS, MINNESOTA

LETTERS

KNOW A HAMSTER WHEN YOU SEE IT?

Sir:

I would like to see an article on the Syrian Golden Hamster. The hamster is new, but it is accepted in the field of science. The hamster is undoubtedly the most important animal discovery in the history of man, and is yet the least known of all animals. Any publicity you might give the hamster will, in reality, be advancing science and research, and naturally will help to eliminate human suffering. An article on hamster raising written in the style of the article on "Squab Raising"—Spring issue of the Farm Quarterly—would be worth reading.

Al Hayner,
Hayner's Hamstery,
P. O. Box 83,
Normal, Ill.

MISSOURI EMPIRE

Sir:

Deering Farms, Inc. owns around 5,000 acres of Southeast Missouri gumbo land. Included, is also a village of about 250 population. We do not, at this time, operate any of this land ourselves. It is all rented. Our rents this year are one-fourth of the cotton and $8 an acre cash on the balance.

We have owned this farm since 1936. Our other sources of income are our store, our cotton gin, our machine shop, our gasoline and oil business, our soybean purchasing business, and our lumber department. Our farm is worth at least $150 an acre.

At the present time, we have just started a cotton seed and soybean seed developing project. We plan, in the future, to put on the market a brand-new cotton seed and soybean seed. Our cotton seed has been sent to all of the state experiment stations in all of the cotton producing states of the south. The cotton seed has been developed during the past six years by Mr. Paul Hutchens. The name of the seed is "Paula." The soybean seed has not advanced far enough yet to have a name. However, there are several of the experiment stations in the south that have had this seed to experiment with for the past two years.

We are interested, and I mean *very* interested in something else that we might plant and grow profitably in this Southeast Missouri section of ours. So far, cotton, soybeans, and alfalfa hay are our main crops. There are a few people just south of us who are beginning to grow vegetables. Their experience so far has been mixed. We have watched these crops grow, watched the yield and the harvest, and have talked to the men a little in regard to the marketing but we would like to have much more information along this line.

I have seen two issues of your magazine. These two issues impressed me very favorably and I immediately sent in our subscription. It is my opinion that your magazine will be a great help to us.

Price Douglass, Manager,
Deering Farms, Inc.,
Deering, Mo.

27 ACRES: SPECIALTY WANTED

Sir:

Congratulations are in order on your excellent presentation of the farm pictures.

Perhaps, we are not the ones to comment or judge the Farm Quarterly, for surely whatever you select for it will be of interest and educational to us, for we are beginner farmers with a world of knowledge to gain. We have 27 acres that must be built up, and by reading and observation hope to arrive at some plans for specializing in a small way. At present, though, our aim is to grow and provide our living from a cow, chickens, a good garden, and hope to be able to buy some farm machinery in the near future. In the meantime, we are distributing manure and lime in preparation.

C. E. Bischoff,
Route 3,
Ravenna, Ohio.

ISOLATED GROUPS

Sir:

I have received more real reading material . . . than any farm magazine I have yet read. I would like to point out two outstanding articles "Water for Thirsty Farms," and "We Git Along." The latter of these was truly an informing and interesting insight into the life of our fellow Americans. I welcome more of these.

In the way of suggestions, I believe a quarterly published magazine should steer clear of articles on legislative and political analysis and predictions. To me these would be wasted space; your articles must be kept up to the high standard which you have set in your first edition.

I think also this letter would not be complete if I didn't also add praise to the article "How Deep O Lord, How Deep?" You have set a high standard. I hope it will be kept that way.

John O. Weston,
Mingo, Iowa.

It is Farm Quarterly's editorial policy to publish in each issue an illustrated discussion of isolated farm groups; their culture, heritage, farm practices, and way of life. The Spring issue discussed the Tennessee mountaineer; the Summer issue the Amish; the current issue the Yankee farmer; the Winter issue the Finns.—Ed.

NO POLITICS

Sir:

Although I subscribed to Farm Quarterly and really love it, your circulation department missed its best bet. Of all farm magazines, yours is the only one that isn't enmeshed in farm politics.

I suggest that in addition to advertising that you give readers "an average of 100 uninterrupted ages of text in each issue", that you also mention Farm Quarterly is for farmers, not for politicians.

Oscar Albright
Big Springs, Mo.

(Continued on page 8)

For More Than 20 Years WARP BROTHERS Have Been Making BETTER WINDOW MATERIALS

THIS NAME IS YOUR GUARANTEE OF TOP QUALITY
Look for the Name WARP'S Printed on Every Yard
ONLY THE GENUINE CARRIES THIS NAME
WARP'S Wyr-O-Glass
ONLY 81c Sq. Yd.
WARP'S Glass-O-Net
ONLY 57c Sq. Yd.
WARP'S Screen-Glass
ONLY 14c Sq. Ft.
WARP'S EXTRA HEAVY FLEX-O-GLASS
GUARANTEED 2 YEARS
ONLY 35c Sq. Yd.

WARP BROTHERS ARE ALWAYS RUNNING TESTS ON THEIR FARM TO GIVE YOU THE BEST WINDOW MATERIALS THAT YOUR MONEY CAN BUY

POULTRY-HOUSE TEST

Warp's Window Materials bring greater profits to poultry raisers. Under Warp's Window Material chicks grew twice as fast as those under glass—with same feed and care. Hens started laying earlier, were healthier, grew bigger and laid more eggs.

HOG-HOUSE TEST

Pigs are healthier and grow faster under Warp's Window Materials. Pigs farrowed in January, raised in this hoghouse with Wyr-O-Glass Windows in place of glass, weighed 110 lbs in 100 days, on inexpensive feed. They were never outside

GREEN-HOUSE TEST

Warp's Window Materials outlast others. A greenhouse is a severe test for window materials. The constant dampness and condensation inside, in contrast to extreme heat and cold outside, makes this an ideal method of proving comparative durability

FARM-HOUSE TEST

Warp's Window Materials hold in heat and keep out cold better than glass. Tests proved that Warp's Window Material tacked over doors and windows saved 38% in fuel on this house. It was warmer, more comfortable, freer from drafts.

ONLY WARP'S SPECTRONIC WINDOW MATERIALS SUPPLY SUPPLEMENT D FROM SUNSHINE — FREE

This Pullet Raised Under Common WINDOW GLASS Started Laying When 23 WEEKS OLD . . .
This Pullet Raised Under WARP'S SPECTRONIC WYR-O-GLASS Started Laying When Only 18½ WEEKS OLD
SAME HATCH
SAME FEED
FED HOME GROWN GRAIN
NO COMMERCIAL SUPPLEMENT ADDED

That's why they produce such remarkable results in Raising Poultry and Livestock on inexpensive home-grown feed

Yes, you can raise and market poultry and livestock faster. Scientific tests, and the amazing results reported by thousands of users absolutely prove that it is possible to market poultry and livestock sooner on home-grown feed—through the use of Warp's window materials.

Warp's "hundred day test" proves that pigs grow almost 50% heavier on the average than those raised under common glass. Pullets start laying sooner, and cockerels will market a half-pound or more heavier in less time on home-grown feed. These amazing results are due to Spectronic Supplement "D", supplied by Warp's Window Materials, to help turn feed into meat and eggs at less cost.

Only a window material with the name "Warp's" along the edge can give you spectronic supplement D from Sunshine Free.

SAVE CHICKS

Cut early death losses. And raise more chicks—faster, stronger, and healthier—with Warp's Window Materials.

MORE EGGS

In a mid-winter test, hens under Warp's FLEX-O-GLASS layed about 40% more eggs than those under common glass.

HEALTHIER PIGS

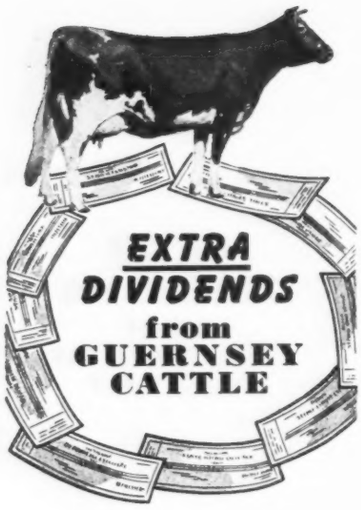
On home grown feed, without commercial supplement added, Warp's experiments show pigs 45% heavier than average in 110 days.

38% FUEL SAVED

Just tack over screen doors and windows. Makes perfect storm proof protection against winter blasts.

SOLD BY LEADING HARDWARE AND LUMBER DEALERS EVERYWHERE

MANUFACTURED by WARP BROTHERS CHICAGO



Investing in a Guernsey herd means *extra* dividends for you—both financial and in breeding recognition. Superior Guernsey heritage assures a stable market for progeny and a premium price for GOLDEN GUERNSEY Milk.

Send for new folder including 21 color photographs and copy explaining how to know good dairy type. It will help you select producing animals, prove a valuable reference. Write now for your free copy.

FREE

656 GROVE ST., PETERBOROUGH, N. H.

THE AMERICAN GUERNSEY CATTLE CLUB

(Continued from page 6)

PREVIEW TEAM

Sir:

One of the staff members in our Dairy Department came in to see me all excited about a new magazine he had picked up on the news stand. It was the most wonderful thing he had seen. Yes, it was the Farm Quarterly. I was interested in his comments, and then revealed to him a little about my interest in the new magazine, and the place it may play in the agricultural interest and activity of certain groups of people.

I received my copy and was very much pleased with it. In the kind of world we are living in today, it seems to me you should be able to sell not only the magazine, but attract high class readers.

C. E. Wylie, Head
Department of Dairying,
The University of Tennessee,
Knoxville, College of Agriculture.

Each Farm Quarterly article is previewed by progressive dirt farmers, agriculture professors and commercial authorities. Dr. Wylie is one of our preview editors. Since the interest of authorities in each of these three groups is both varied and angled, the thoroughness of a Farm Quarterly article is made possible only by the kind cooperation of 86 skilled men such as Dr. Wylie.—Ed.

FIRST COVERED BRIDGE IN AMERICA

Sir:

In the current issue of The Farm Quarterly, pages 20 and 21 " The Village Blacksmith" and "The Covered Bridge" hold particular interest for me. The first covered bridge of the 3,200 and some odd constructed in the United States, still stands and was built by my great grandfather, a village blacksmith in New England.

Capt. C. L. Phillips,
56 Stuyvesant Place,
Staten Island, N. Y.

A beautiful flock of sheep is both profitable and essential on every farm.

No class of livestock returns a higher percent for the money invested as sheep.

Write for beautiful illustrated booklet prepared by nine authorities. FREE

AMERICAN HAMPSHIRE SHEEP ASSOCIATION

72 WOODLAND AVENUE
DETROIT, 2 MICHIGAN

HAMPSHIRE SHEEP

Start a flock of purebred Hampshire sheep. Ewes and rams available. Write for booklet and price list.

LAKEWOOD FARMS

Franklin, Indiana

Daisy Cattle Markers

Delivery one to three days Postpaid

NO. 21—FOR NECK. Adjustable chain. Numbered both sides. Plated. $9.50 per dozen.

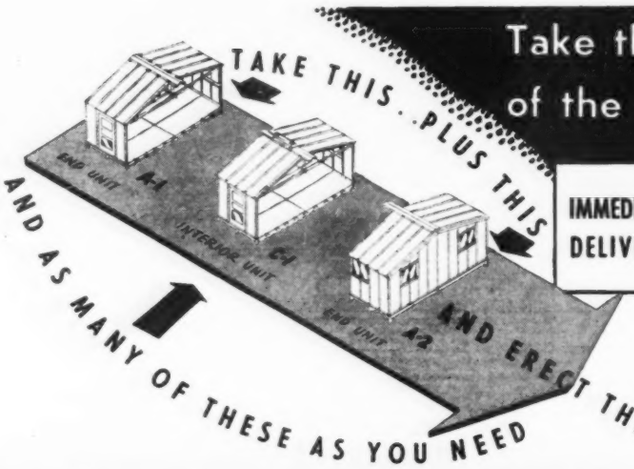
NO. 17—FOR HORNS. Adjustable chain. $8.00 per dozen.

NO. 38—DOUBLE PLATE NECK CHAIN. Upper portion strap. Lower portion chain. $12.50 per doz. Sample mailed for $1.00. Write for folder.

GOLDEN ARROW FARMS
Dept. 11, Box 7 Huntington, Indiana

Take the easiest, most economical way out of the construction shortage with

STEELCRAFT *Pre-fabricated* STEEL and ALUMINUM UNITS



SWIFT . . . PRACTICAL . . . PERMANENT OR PORTABLE
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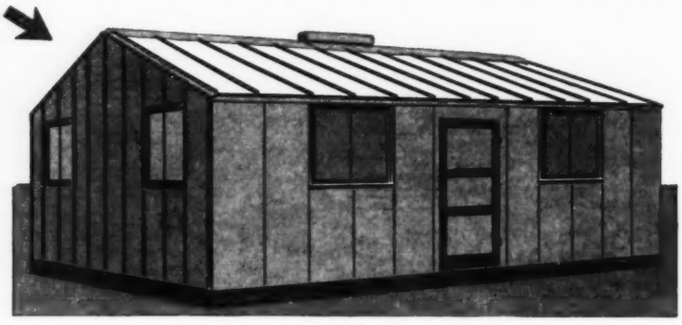

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For hogs, copy of breed paper and literature, write to:

NATIONAL SPOTTED POLAND CHINA RECORD

Fred Obenchain, Secy.-Treas.
3153 Kenwood Ave., Indianapolis 8, Ind.

(Continued from page 8)

THE BIG BLACK ONES

Sir:

I would like to see an authoritative article on the future of the pure bred breeder (cattle, hog, and sheep) for the next three, and five years.

I am especially interested in Angus cattle, and it would please me very much to see an article about the Angus breed with some good illustrations. Usually the agricultural papers in the middle-west and the south west naturally talk a great deal about the Hereford.

We Angus men would appreciate very much a plug now and then for the black cattle.

John H. Small, III,
Latonsville Stock Farm,
Laytonsville, Md.

Coming up.—Ed.

SMALL AND SELF SUFFICIENT

Sir:

Your articles are sufficiently technical without becoming stuffy; they were extremely interesting yet did not sacrifice clarity or detail for the sake of interest.

My interests are with the small farmer who makes farming a way of life rather than a business: the man who tries to be self sufficient insofar as he can, raising what he needs to feed his family and his stock plus a cash crop to cover expenses for items which he cannot personally produce. Since many small farmers tend to become poor managers and sloppy book-keepers I should like to see an occasional article on management geared to the small family-size farm. I find most farm management books and articles inadequate in that they consider only the mammoth over-size farms in which I am not interested.—A firm believer in things "natural," I should also like an occasional article on compost as opposed to chemical fertilizer which I think will eventually ruin our farms. In your series of articles about American groups throughout the country you might some time write about the American Negro.

Wish you success in what I think is a fine contribution to our literature on farming.

Rev. Gordon Krahe, O. F. M.,
St. Anthony's Friary,
307 Grover St.,
Greenville, S. C.

LIFE BEGINS

Sir:

Farm Quarterly was very much enjoyed. We are glad that finally there is a *good* farm magazine to be had. We would like to see it come out monthly, if it were possible.

Your articles are all very good and interesting and written in understandable language.

After June I'm going to be a farmer's wife and I'm trying to learn all I can beforehand because I've never lived on the farm before.

Anna Kroeker,
719 East 4th,
Newton, Kans.

Please write us in a year, Anna, and let us hear how you made out.—Ed.

YOU TAKE YOUR VACATION IN HEAVEN

Sirs:

I was delighted when I chanced to find a copy of the first issue of your grand magazine in a local drug store.

I am an artist and subscribed to Farm Quarterly because I love the pictures in this first issue, and expect others of equal charm to follow.

I would like to read how to build rustic bridges, arbors, fountains, beautiful gates, etc. And how to sell quality products like my strawberry preserves.

Can any of your experts answer this question? How may the farm wife have a vacation? All that have seen my copy of the Farm Quarterly admire it very much. I wish it uncountable years of success.

Mrs. C. W. Stripling,
Route 1,
Roland, Ark.

Mrs. Stripling, meet Miss Kroeker, above.—Ed.

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Practically all new John Deere integral and drawn equipment that can be handled with a Model "A", "B" or "GM" Tractor is adaptable to Powr-Trol operation. Change-over parts for many older John Deere implements are in the process of design or manufacture. Here is a Model "B" Tractor and new Truss-Frame Plow equipped for remote-cylinder operation.

POWR-TROL... *Another* JOHN DEERE *FIRST*

IN WINTER the properly cared-for flock has both open and covered exercise space with good hay, water and grain available.

THE FARM FLOCK

BY L. K. BEAR

WHEN the meadows begin to turn green in the spring, nature has set the stage for one of our best-loved country scenes. Snowy white shorn ewes and baby lambs move slowly across the pasture while the month-old lambs play stiff legged in front of the flock. Then, suddenly, as if by signal the game ends, they rush off to bunt their mother's udder and nurse greedily with tail stumps vibrating from side to side.

Of course the practical farmer may tap one on the shoulder and disturb this rural reverie by the blunt statement that, "when lambs and wool are sold the view is not weighed in". Sheep provide the cheapest way to harvest pastures and hay crops without expanding housing facilities or increasing the farm labor requirements. Many farmers find sheep to be a profitable enterprise. Sheep make ideal 4-H Club projects since they are extremely interesting to children and easily handled by them.

Farm flocks are neither as numerous nor as large as they used to be. Back in the pioneer days, the hardy sheep provided meat and clothing. Wool, a non-perishable commodity, could be sold at a distant market. With better transportation and growth of cities, more and more land was broken for tilled crops and sheep were replaced by dairy cattle and hogs. Today, the movement has been just about completed and the bulk of our domestic sheep are found in the semi-arid range states and in Texas. The same is true abroad. The big flocks are found in Australia, South Africa, Russia and South America in the more or less dry open country. The flocks that remain on midwest farms today supplement the general livestock and farming operations, and as such are a profitable enterprise if properly managed.

Labor Peak In Early Spring

The labor requirements for sheep are relatively simple. Unlike dairy cattle, they require no daily individual care except for the ewes at lambing time. The labor peak for sheep comes in the early spring at shearing time and when the ewes are lambed out. Neither of these jobs need cause neglect of important field work. Very few farmers shear their own sheep. The harvesting of the fleece is hard work that requires a complicated skill and professionals who call themselves custom shearers provide shearing service. The work of a few days and the rest of a few nights will be interrupted in order to attend the ewes through the lambing period, but most farmers arrange this season so that it precedes the rush of field work.

H. H. WALKER of Woodbine Farms near Gambier, Ohio. Practical sheep-breeder, ardent soil conservationist, he and his father J. F. (Jap) Walker are nationally known for their top Corriedale and Southdown sheep.

SOUND LAMBING practice is to put ewe and lambs in 4 by 4 foot hinged panel pens at birth. This permits checking health of both mother and lambs and prevents the ewe from disowning or favoring one lamb. In cold weather it saves many lambs.

SIX MONTH'S growth of Corriedale ewe fleece. This distinctive wavy crimp is desirable. Each fibre is about 1/1000 of an inch thick, and is coated with a thin film of lanolin, base of many cosmetics. Good oil quality is the sign of healthy sheep.

Any barn or shed space that can be protected from drafts provides satisfactory lambing quarters. Elaborate equipment is not only unnecessary but undesirable. Inexpensive movable racks and small portable water vessels are best. The movable racks serve as partitions and a number of panels and hinged hurdles enable the flock owner to provide the variable sized enclosures to meet the needs of lambing time. Such a simple and convenient lambing quarters was made from the driveway in a Hancock County, Ohio, barn. Hinged hurdles set up along both sides formed individual lambing pens leaving a service alley through the center. The owner also used this space for winter time storage for an idle hay wagon.

Mixed Grazing Pays Off

Sheep can be pastured with other farm livestock. However, a farmer's best judgment would not encourage him to turn ewes and baby lambs into a small field with old sows and pigs, particularly if the sows have a criminal record of catching chickens. Mixed grazing works; cattle grazing an area can check the growth, leaving shorter, more tender forage for the sheep. One of the British Experiment Stations proved years ago that more pounds of beef and lamb were produced per acre of good pasture when mixed grazed than when similar pasture was utilized by cattle or sheep separately.

For at least seven months of the year the ewes and lambs can feed themselves on pasture. Their winter feed is hay plus a small allowance of grain. In fact, with the newer measures of parasite control, some farmers are wintering breed ewes on legume hay with grain feeding limited to nursing ewes and creep-fed baby lambs.

The strategic place of legumes and manures in modern crop rotation plans is well understood. This means that midwest farms are producing an increasing amount of the very best kind of feed for sheep. Other livestock, particularly cattle, could convert some of the pasture-hay type of crops into marketable products, but they require additional barn space and more labor which eliminates their consideration for the limits of both have already been reached on many farms.

The prospective sheep owner should have some liking for sheep and a farm adapted to handling them. Not every one has a natural interest in sheep but no one need fear them. They are naturally timid and easy to handle. They do best on well-drained land. Larger numbers are often found in rolling or hilly country, but the sheep are there because of the pasture acreage, not because of the hills. Sheep do not like mud. One breed was developed for marsh lands but generally speaking, sheep dislike soggy or muddy footing.

Ewes shying away from mud are reminiscent of the ladies of the Gibson Girl era who shyly reached down to gather their long skirts before crossing the street.

Sheep have good reason for disliking mud. It is one of the causes of serious foot trouble. Low, or wet land is just not adapted for sheep raising.

There are a few fundamentals which are essential to the success of any livestock operation. They are:

(1) Selection of animals

(2) Feeding

(3) Care and Management

(4) Marketing

The list is short but the four phases are essential. Considering these points separately serves as a reliable guide for raising sheep.

Selection is a continuous process. In the summer or early fall a farmer will be "looking for a good ram" or some ewes to be added to the flock. At lambing time, at shearing time and through the nursing period, he will observe his ewes and make note of individuals to be "culled" from the flock because of poor performance. The farm flock produces two crops, lambs and wool. The profitable flock is one that produces lambs and fleeces that will grade well in the market. Today, and for as far as we can see into the future, the lamb crop is and will be, the principle source of income. Selection should therefore be based upon conformation and rapid growth of the lambs.

Selecting The Ram

Some men make it a point to learn whether a prospective sire was born a twin. Prolificacy is important, but twins are produced regularly enough in most mutton breeds. Death losses in young lambs are far more important. One interested in a sire of replacement ewes should get all information possible on his female relatives. Are they good mothers? Have they, as a group, been able to wean a good lamb crop? Are they good milkers and good shearers? The answers to these questions should be sought while making an observation of the ram's individuality, his conformation and fleece. This information may lack glamor and there are breeders who would prefer to speak of the splendid show ring winnings of the great, great, grand sire. It is well to remember that the influence of the eminent ancestor is halved each succeeding generation. Unless close matings are involved, 15/16 or 31/32 of the young ram's pedigree may consist of sheep other than "Old Illustrious" who doubtless was a champion.

The choice of a ram for a farm flock quite naturally falls upon one of the so-called meat breeds of which the English or Down breeds are typical. Whether it shall be a Southdown, a Shropshire, a Hampshire, or an Oxford ram, will depend upon the time of year the lambs are to be dropped and whether or not ewe lambs produced in the flock are to be developed for replacements of old or non-productive ewes. To this list of the older meat breeds the newer Corriedales must be added. Originating in New Zealand it has become very popular in this country for its fine carcass and heavy shearing. Lambs sired by rams of any of these breeds as well as others can "top the market" but each breed has special adaptation.

The Southdown is the acme of meat sheep conformation. They hold most of the honors in lamb carcass competition. The breed is very old and its rams are pre-potent as sires of shapely market lambs. However, the cross-bred daughters of Southdown rams should never be saved

A FLOCK of Southdown rams search for early spring sprouts. The sheepman's best friend, a Border Collie, presides with an iron paw.

FARM FLOCK shearing is usually done by custom shearers, who travel from farm to farm, and are specialists at the trade.

PROPER PROCEDURE: Start with open belly fleece, then hind legs. Then neck is opened up, left front leg sheared, and left side and back finished. Sheep is raised to sitting position; neck, shoulders and right side finish the job.

CERTAIN PRECAUTIONS are necessary for expert or amateur shearer. (1) Don't cut the animal. (2) Leave the wool in one clean compact pile on a rug previously spread on the floor. (3) Keep shears close to the skin so the staple will be long. When tying fleece for shipping it should be made into a compact, fluffy square, so it feels light in proportion to size.

for brood ewes because they are too compact of body for easy lambing, and are rather poor milkers and light shearers. Many farmers are using Southdown rams, selling their ewe lambs along with the wether lambs. It is their practice to purchase young yearling ewes from the western states and it works out satisfactorily. These men say "Why should I fool around raising my own yearlings when I can purchase a large roomy, rugged yearling for about the same money that I receive for a lamb?" The popularity of this breeding program has grown. It is the breeding pattern responsible for the Blue Grass lambs of Kentucky and for many of the "Double Blues" and "Single Blues" handled in Ohio pools. These terms refer to grading that has been done in the sheep improvement program of 18 Ohio counties. The works starts with the use of pure-bred rams and culled ewe flocks. These are properly fed and managed and the lambs are assembled at 16 market locations on scheduled dates. The lambs have been rigidly graded and when they are brought to the sale they are pooled with other lambs of the same grade. Proceeds from the sale are apportioned among the consignors according to the weight of his lambs as sorted into the various grades. The grades established follow the traditional standard, and not the new O.P.A. grading system. To give these lambs a "trade mark" at packing plants, the Ohio Committees have used circular color brands. Two blue circles mark the first grade; one blue circle the second grade; a red circle the third grade; yellow the fourth grade and on down the line. After a dozen years the brands have established a reputation at the plants of eastern packers, and in the language of the trade they are referred to as "double blues", "single blues", "red dots" and "yellow dots", even though the last two are also circular brands.

In the western corn belt some farmers hold western ewes for a single lambing season and consignments received at the Kansas City market have included the dams along with their lambs. This may be an extreme example since Kansas winter wheat pasture is involved, but it does indicate the economy of the practice.

Home Grown Flock Replacements

The owners of the small flocks usually prefer to make replacements with home grown yearlings. A desirable average age is maintained in the brood flock when well grown yearlings make up about 20% of the group. The ram used under this plan should not only be of the kind that will sire desirable market lambs, but satisfactory brood ewes as well. His daughter should be able to produce lambs with the minimum of difficulty, have plenty of milk for them and shear a weighty fleece. This calls for a combination wool and meat breed and undoubtedly explains the popularity of Shropshires in the middlewest.

Shropshires and Southdowns are only the beginning of a lengthy list of adapted breeds. To reach an understanding of adaptability it is necessary to keep in mind an accurate picture of the products we are trying to produce—lambs and fleece wools. The strongest wholesale demand is for lamb carcasses weighing approximately 40 pounds. This calls for a finished lamb weighing about 85 pounds on foot. Naturally a serving of roast leg-o-lamb from a 100 pound choice lamb can be made to taste just as good as one carved from the leg of an 85 pounder. But lamb legs, unlike hams and beef rounds, are sold whole and there is not enough room in the modern kitchenette for the 10 or 11 pound leg of lamb and the housewife, at the same time. The armed forces accepted larger carcasses during the war, but the peace time demand for the larger carcass is limited to hotels, restaurants and ocean liners.

THE GOOD SHEPHERD knows his flock; sheep feeding, fitting for sale and show, the ability to deliver lodged lambs, endless patience and love for the animal, are all part of his make-up. Ewes that are near to lambing are given the protection of a barn. Lambs often have to be helped along during the first few crucial minutes. The midnight vigil that every sheepman knows is the walk in the pens, flicking the flashlight on and off to check the ewe's hind quarters; 1 ½ lambs per ewe per year is a practical average.

What does this mean to the farmer about to select a ram? It means that if he chooses a Hampshire or an Oxford ram, he must remember that his lambs will grow fast. If he does not have them dropped early, suckled by good milking ewes, and creep fed in the barn, he may be heading for disappointment. It takes such treatment for Hampshire and Oxford sired lambs to develop a finish at 80 to 85 pounds for an early market when these lambs sell best. Handled otherwise the lambs will be mostly frame and lacking in flesh when they reach the desired weight. They will be penalized on grade if sold in this condition and if carried to finish they will weigh 100 pounds or more for which there is a price penalty of a cent or more per pound. Rams of these breeds are fine for a mid-winter lambing season and Hampshires are very popular in Virginia and Tennessee where the winters are mild.

Breed Associations

For information on registered stock of any of the various breeds the secretaries can be addressed as shown below. Several of the associations issue a yearly "For Sale" list which gives the breeders by states and lists the number of rams and ewes in each flock that will be for sale. The Associations are:

Miss Julia M. Wade, Secy.
The American Shropshire Registry Assn.
Lafayette, Indiana

Mr. W. L. Henning, Secy.
American Southdown Breeders' Assn.
203 Agricultural Building
State College, Pennsylvania

Mrs. Helen Tyler Belote, Secy.
American Hampshire Sheep Assn.
72 Woodland Avenue
Detroit, Michigan

Dr. Fredric S. Hultz, Secy.
American Corriedale Association, Inc.
1007 Sheridan Street
Laramie, Wyoming

Mr. R. E. Brown, Secy.
Columbia Sheep Breeders' Assn.
Box 334
Bozeman, Montana

Mr. J. R. Henderson, Secy.
Continental Dorset Club
Hickory, Pennsylvania

Mr. C. A. Williams, Secy.
National Suffolk Sheep Association
Middleville, Michigan

Mr. Walter Staley, Secy.
American & Delaine Merino Record Assn.
Marysville, Ohio

Mr. J. M. McHaffie, Secy.
American Oxford Down Record Assn.
Clayton, Indiana

Grade or cross-bred ewes, frequently called "mixed" by their owner are typical of the farm flock. When these are closely culled and bred to a good pure-bred ram they do their job well and usually produce uniform lambs. Wool is of secondary importance but fleeces of more than eight pounds of combing wool should be the goal.

Feeding the average farm flock is relatively simple. The sheep can be moved from permanent pasture to hay meadows for the seven months or more of the grazing season. Their pasture needs are met on many farms by grazing odd lots and

THE SIGHT EVERY SHEPHERD DREADS. Sheep killed by dogs represent the greatest hazard in sheep raising. Good fences, enforcement of laws that require owners of dogs to take care of them, and properly trained farm dogs are the best ways to combat the dog menace. Farm dogs trained to work with the flock serve a double purpose; the sheep become accustomed to dogs and will not scare and run from a stray. The farm dog also is trained to be the protector of his flock and will chase other dogs away. Dogs become sheep-killers when sheep scare and run, causing the dog to get excited, give chase, attack and kill. Dogs that kill sheep rarely eat them, are difficult to cure once the thrill is experienced. In most states claims for killed sheep are paid from license fees.

fence rows utilizing otherwise unused pasture. The season can be extended in the spring by a short period on fall seeded small grains and by turning into corn fields in the fall. Wheat, barley, and rye, plus the early growth of blue grass in the fence rows could be used in the spring to a greater extent than we now observe in common practice. The sheep will not noticeably damage the yield of grain provided they are removed before the grain has made its first joint. The trampling of the light animals is a definite benefit to grass seedings. Should rains make the fields muddy, the small grain pastures will not be attractive, but if they can be used for but a brief period, the succulent growth will benefit nursing ewes. Confield pastures are more widely used. Here the sheep can consume the growth in the fence rows as well as the lower blades of corn. Some farmers "lamb down" corn, but the farm flock of ewes will not work down the stalks noticeably. The desirability of cornfield grazing depends upon weed control. Contamination of the fleece with burrs can make the pasture costly through reduced wool value. Burry fleeces bring about 5c per pound less.

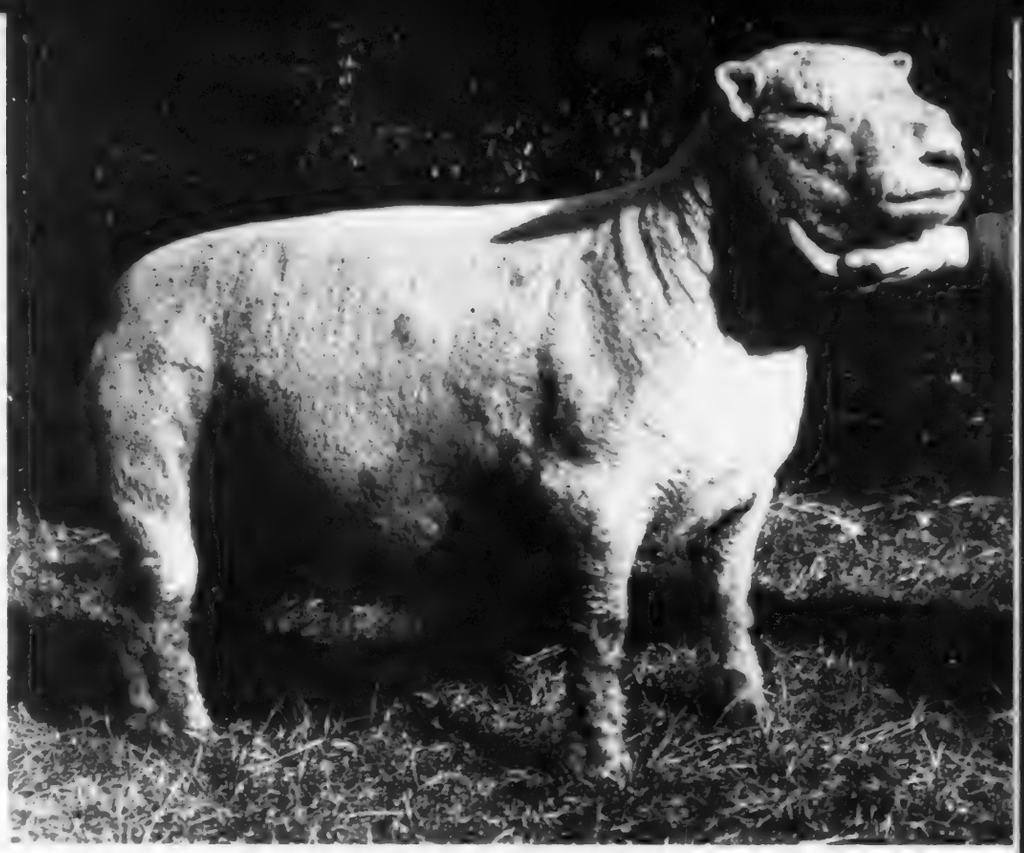
Farm Flock Thrives On Pasture

Winter feeding is largely a matter of hay. Healthy ewes will require very little grain when offered legume or mixed hay of reasonably good quality. It is very important that the ewes gain in weight throughout the gestation period. It is extremely important that they should not lose weight during the last 6 weeks. Most flocks receive a mixture of farm grown grains at this time. It is unfortunate that many farmers give first consideration to grains and concentrates when considering the winter feeding of their sheep. We must remember that sheep are cud chewers or ruminants. This means that nature meant roughage to be their principle feed and undoubtedly explains why the average healthy flock thrives so well on just good pasture. Through the newer knowledge of nutrition we have reached some understanding of the marvelous function of the rumen or paunch whereby many of the animal's complex needs for vitamins and proteins are satisfied through the activity of microbes that live in this interesting processing chamber. One of the most practical suggestions for winter feeding brood ewes is saving some of the very best hay for the pre-lambing and nursing periods.

Hay quality varies from year to year and ewes that failed to gain properly during pregnancy and reach lambing time in poor condition are bound to have weak lambs and be poor milkers. Grain mixtures can be a real help as a supplement to roughages. Usually from ½ pound to 1½ pounds of grain daily is best. A good ration for stimulating milk production is:

ROUGHAGE

Legume hay ..... 1 lb.
Corn or grass silage, not over.....3 lbs.



IN HORSES they call it "class", in a ram it's "studdiness". This is Woodbine Farms "Renown", a three year old Southdown, shown out of fleece. His rear quarter development is as fine as any of his breed. His strong top line, wide loin, legs set well apart, masculine head, alert carriage, bold eyes and intangible pure-bred quality mark him as a champion. Aside from show points a ram's value must be judged on his prepotency and the record of the ewes in his line to wean a good lamb crop. Most meat breeds now produce twins with regularity. The ability to raise twins must also be considered.

THE LAMB "CREEP" permits the lambs to get away from mama for short periods, eat especially tender hay, and have some oats of their own. This creep has a light to keep it warmer than the rest of the stall, a good idea in cold climates. Hay feeders also can be turned over to make part-time creeps.

ARTISTS DREAM of finding a scene like this; the farmer enjoys it no less, even though, as the expert says, "the view is not weighed in with the wool and lambs".

THESE SPECIMENS of wool "in the grease", or in the uncleaned state, are grades in the United States Classification. The grades are based on the diameter of the fiber, and in all there are twelve numerical grades. To compare the numerical grades with the other type of classification, the "Blood" grades, see table below.

OFFICIAL U. S. STANDARDS	"BLOOD" GRADES	OFFICIAL U. S. STANDARDS	"BLOOD" GRADES
80's, 70's, 64's	Fine	46's	Low ¼ Blood
60's, 58's	½ Blood	44's	Common
56's	⅜ Blood	40's, 36's	Braid
50's, 48's	¼ Blood		

GRAIN MIXTURE

Corn	5 parts*
Oats	3 parts
Bran	2 parts
Protein supplement	1 part

(*Parts by weight)

Corn 3 parts, oats 3 parts, and protein supplement 1 part is also a good mixture. Wheat or barley may be used to replace corn up to one-half of the total grain ration. Whole or cracked soy beans make a good protein supplement which may be used in place of one of the oil-cake meals.

It is not always possible to avoid feeding such roughages as mature timothy, corn stover and oats straw. On rare occasions, corn silage may be the only available roughage. It is possible to get through the winter by feeding these materials provided sufficient grain mixture is fed to make up their lack of digestable nutrients, enough protein supplement to supply that usually furnished by legume hay and minerals adequate to provide those normally supplied by good pasture or higher quality roughage. The grain mixture suggested for these conditions is:

Corn 2 parts		Corn	
Oats 2 parts	or	Oats	Equal
Protein			Parts
Supplement 1 part		Bran	

A suitable mineral mixture is one containing equal parts of finely ground limestone and salt offered free choice.

There are a few chores that go with sheep raising that must not be neglected. All lambs should be docked and all ram lambs to be sold later as market lambs should be castrated. These tasks do not require much skill but must be done on time and the best time is when lambs are 10 days to 2 weeks old. Long tailed lambs gather filth, present an unattractive appearance, and invite "fly-strike". Buck lambs sell at a discount of usually $1.00 per cwt. All this adds up to good wages for the seconds of time devoted to removing tails and producing wether lambs. Docking of small lambs produces a much smaller wound with less shock than it does with older, larger lambs.

Worming With Phenothiazine

A profitable flock is always a healthy one. Sheep are plagued with very few diseases under farm conditions. The principal health hazard is that of parasites. The warm, dense, fleece and the habit of close grazing tend to make the sheep a good host for both internal and external parasites. The damaging effect of uncontrolled parasites has removed many flocks from the farm scene. Modern insecticides used in dip form make it possible to eradicate both ticks and lice with a single immersion and on the farm dipping service is made available in many sections of the middle west by the operators of portable vats. In the opinion of all sheepmen, the small blood sucking worms that infect the digestive tract are the cause of the greatest losses. There are more than a dozen types and several of these are usually present at the same time. There is a large flat tape worm that plays havoc with lambs. Infective larva develop from eggs voided in the dung. Normal mortality of the microscopic larva is greatly reduced by cloudy, rainy weather which has consequently been called "bad weather for sheep".

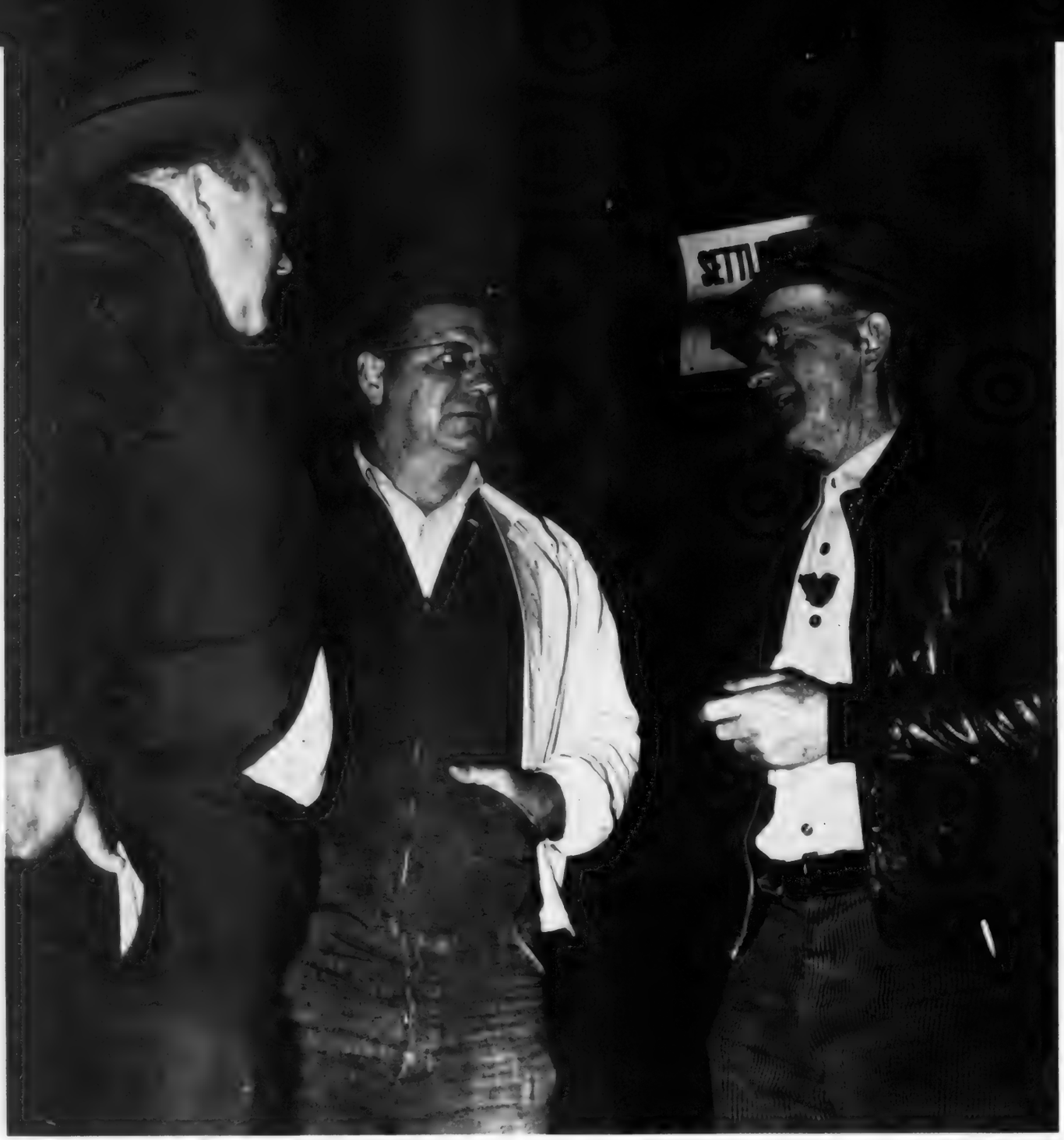
The key to successful control of the worms is the fact that a part of their life cycle is spent outside of the sheep. Baby lambs are not born wormy. So, if the sheep can be managed in a manner that prevents an opportunity to pick up serious numbers of infective larvae, they will escape worm damage. Eggs of most worm forms do not incubate into infectious baby worms after continued cold weather sets in. How do these facts help? Well, the small flocks of just a few sheep that have the run of a large farm illustrate the benefits of sanitation. Sheep so handled are almost always found to be robust and seldom show any signs of worms. They are changed from one field to another and by the time the few voided eggs hatch, the sheep are moved to a different field. The pick-up is extremely slow as compared to that taking place in a larger flock confined to a permanent pasture of moderate size.

Health Hazards

Drugs have been used for years to deworm sheep. A review of the recommendation of our Experiment Stations

(Continued on page 126)

THE LARGEST flocks of sheep in this country today are in the semi-arid western range states and in Texas. Here sheep are a primary enterprise. This Colorado sheep herder spends weeks alone on the range, with only his horse and dogs as companions.



"THE WAY I see it, crossbred beef makes more money than purebreds, especially three way crosses with Angus bulls and Shorthorn-Hereford cows." Charlie Maxwell (right) and Earl Dresdach (center), Ross County Ohio feeders, talk things over with Ralph Castor (left), a Chillicothe packing plant buyer. Livestock auctions provide an open forum for the exchanging of ideas.

STOCK AUCTION

THOUGH essentially a modest man. Lew Halderman, Secretary of the Scioto Livestock Sales Company of Chillicothe, Ohio, pulls no punches on the subject of livestock auctions.

"Barring diseased stock," he says flatly, "we can sell any animal able to walk or crawl into the auction arena under its own power!"

Behind Halderman's statement are fourteen years of experience gained the hard way. It began when a small group of farm owners opened the doors of their new auction plant in 1931. In its infancy, the Scioto Sales Company was wholly unpredictable. The plan to operate a centralized livestock auction was only mildly successful in the land of its origin, Kentucky, during the late 20's. A later, more encouraging venture at Gallipolis, Ohio, was an omen that an auction might succeed elsewhere.

Looking back on it now, Lew Halderman, Bill McGinnis, and other old timers in the company still speak with awe of their opening day.

For one thing it was Friday the 13th, and raining pitchforks. The owners, novices in the auction business, were fidgety as bob-tailed horses in fly-season. Would the rain and the date keep farmers and buyers away? What if some forgotten detail . . . ?

But the farmers and buyers did attend. Slowly at first, then like a swarm of locusts, they descended upon the sprawling red

NOT A FLIRTATION—just a bid. Livestock auctions make it possible for this farmer to enjoy the same buying and selling advantages as the big moneyed producers.

A LIFTED FOREFINGER signals this packing plant buyer's bid. At the Scioto Auction, packers receive no special privileges such as private booths, but share wooden benches.

A TYPICAL "SECRET" BID. To keep from tipping off competitors as to their needs, some buyers indicate their bids with casual gestures which have been pre-arranged.

A GOOD RINGMAN is a showman as well as an assistant auctioneer. Flourishing a heavy stock cane the ringman is constantly on the move, prodding the animals into action, augmenting the auctioneer's harangue, arousing competition among the buyers, and relaying the bids he receives to the block. He, as well as the auctioneer, has followers who will give their bids to no one else.

FOR FOURTEEN YEARS Colonel Howard Titus has cried the Scioto Auctions each Friday. (Note the Public Address System microphone clipped to his necktie knot.) An affable, easy-going sort of man, Titus is quick to sense the moods of his audience. If the farmers become restless, he whips up their interest with several quick low sales. If an argument develops over a sale he switches on his "peace-maker personality," tactfully re-opens the bidding, and continues until one of the disputing parties drops out.

auction house. They came in new cars, in jallopies, in stock trucks and in wagons. They tied traffic in knots for blocks around and turned the empty stock pens into a seething mass of bleating, bawling, squealing animals.

The new operators were thoroughly initiated into their business on that first day. Shortly after the weighing scales broke down, Bill McGinnis was standing in the narrow weighing office when a 1400 pound bull sauntered into the room. There was no time for Bill, a large man, to dash out the opposite door, so he did the next best thing. He pressed back against the wall, drew in his bay window, shut his eyes, and waited.

In the meantime, Lew Halderman, watching Bill's predicament, dashed through the wrong gate enroute to the weighing office and found himself in the same pen with a testy sow and her litter of pigs. The sow took one look at Lew and made for him. Lew took one look at her and went away from there.

Witnesses swear that two all-time records were set simultaneously. Bill made himself the skinniest he has ever been, and the bull brushed past him without a glance. Lew, a short man, sailed over a five-foot

CASH MONEY plus persuasion may cause livestock to change hands several times during an afternoon. Auction day is also a day of private dickering between farmers who buy, sell, or trade everything from fruit jars to tractors and farm trucks.

fence without touching the top rail, a feat he has not accomplished since.

THAT was opening day fourteen years ago. Today, the Scioto Company handles approximately 80 per cent of the livestock bought and sold within a radius of 60 miles of Chillicothe. It is equipped to handle 800 head of cattle, 1000 hogs, 500 sheep, and 400 miscellaneous animals a day. Though horses and mules are occasionally sold on consignment, cattle, sheep, and hogs account for the greater part of their two million dollar annual sales.

Not all livestock auctions are privately owned. Cooperative auctions, though outnumbered approximately 9 to 1, are being successfully operated in various parts of the country, particularly in Ohio and California, the first western state to introduce them. The minor role played by cooperatives in the development of auctions has been largely due to the high initial cost of auction facilities (only a few auctions operate oftener than one day a week), and to a dislike for the speculative risks involved. But whether privately owned or cooperative, both types of auctions proved the value of their services to farmers, packers, and buyers during the crucial years of the depression.

Speaking in retrospect, one corn-belt farmer says: "When things were toughest, a farmer with one or two head of stock to sell just about had to take what he could get when—and if—he could find a buyer. The auctions put an end to that problem. Once they got going, the same farmer could thumb his nose at low offers. By hauling his fat hog or feeder calf to auction he was pretty sure to get a better price where competitive bidding put him on the same selling basis as a big producer."

Meat prices were unstable during the depression and packers were reluctant to sacrifice the time and expense necessary to pick up a few animals at a time. The auctions helped the packers too. One packing house buyer said: "The auctions worked like a magnet, drawing in livestock from miles around. At the auctions we could buy the weight and quality of animals we wanted—when we wanted 'em. And in volume."

These were the advantages that caused auctions to spread. By 1937 there were 1317 livestock auctions operating in 37 states, more than half of them concentrated in the corn-belt area. It is impossible to estimate how many head of livestock were sold through auctions at that time, for sales varied according to the locality and type of livestock produced. In a study of 139 auctions operating in 14 mid-west states, it was disclosed that each auction averaged 33,481 animals during the year.

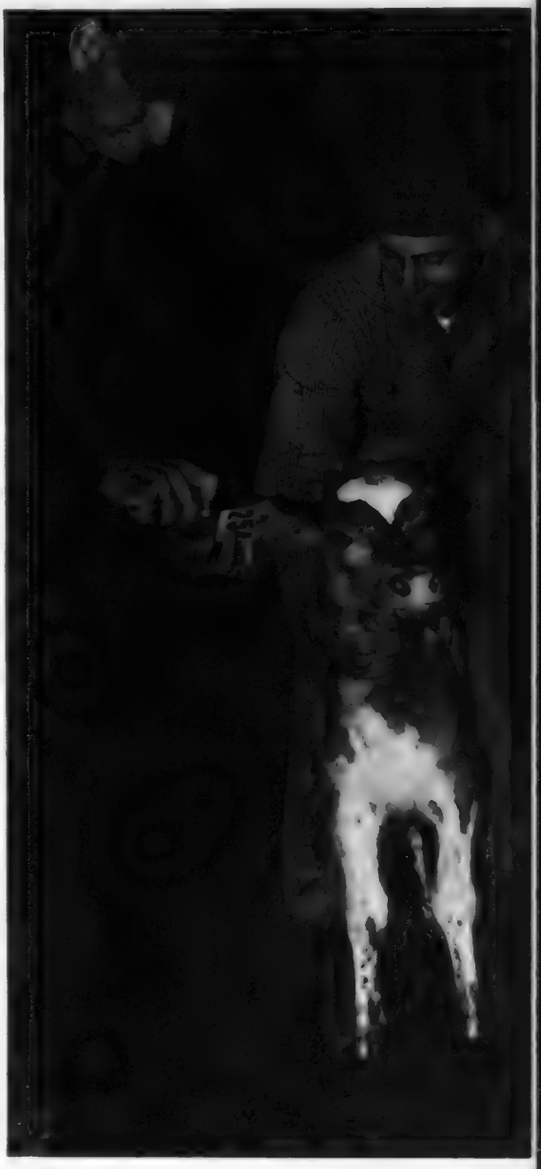
Auctions continued to flourish since 1937, but wartime restrictions have curtailed any great degree of expansion. The largest auctions are located in the western plains states where feeder cattle are brought in from distances up to 100 miles; this in contrast to the 25 to 50 miles average drawing radius of eastern auctions.

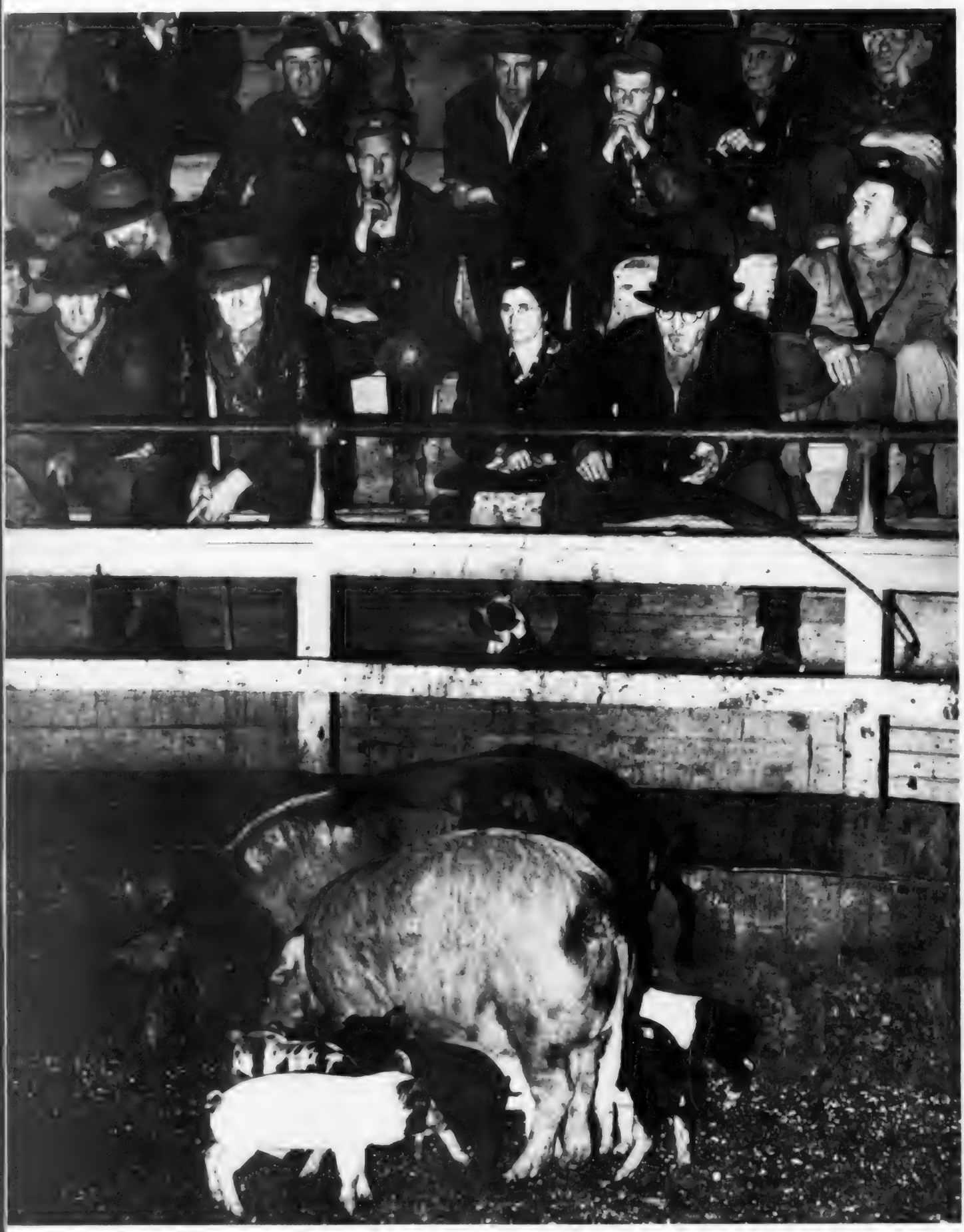
Square, round, or oblong buildings built to shelter the stock pens, predominate in the east; open-air street auctions where livestock are enclosed in movable hurdle pens are common in the Mississippi Valley; and various barn-corral combinations are to be found in western plains states.

THE Scioto Livestock Sales Company, one of the largest in Ohio, is in most respects typical of the better type of privately owned auctions in the mid-west. Its single, two-story frame building is as plain and unpretentious as an old dairy barn. It is conveniently located on a railroad siding, and the ground floor is devoted to a maze of pens equipped with ingenious gates through which livestock file past the weighing platform into grading pens and, eventually, the auction arena. On the second floor are the offices, a restaurant, and a large amphitheater where farmers and buyers occupy tiers of wooden benches facing the auctioneer's block in the arena below.

Auction operators realize that competi-

EAR-TAGGING ANIMALS with clips bearing the owner's identification number prevents mix-ups where animals are graded and turned into common pens. At some auctions the identification numerals are painted or pasted on the animal's flanks.





THE PROSPECTIVE BUYERS as the auctioneer sees them. Though some farmers bring canes and buggy whips with which to prod the animals into action, this diversion, like their facial expressions, belies who will do the actual bidding. Says Titus: "Lots of farmers wear their poker faces to auction. If it's pigs I'm crying, it's the pig-raisers I watch—even though they show no interest at all."

tion among buyers is the lifeblood of satisfactory sales. To insure this competition they arrange their sale days so that buyers can move from one auction to another on a more or less established schedule.

Friday is sale day at the Scioto auction. By ten o'clock every Friday morning farmers in work clothes begin to arrive with loads of livestock. An hour later all nine truck unloading docks are in full operation and a uniformed officer, furnished by the city and paid by the auction company, is directing late arrivals to the waiting lines.

Since the majority of farmers prefer to have their livestock graded, and since most buyers prefer to purchase in uniform pool lots, Scioto Company employees grade all livestock offerings before the sale begins.

Calves are graded into seven classifications: choice, good, medium, good light, medium light, common, and culls. Sheep are graded in a similar manner, and hogs are graded for weight and quality. All cattle are ear-tagged; cattle to be returned to the country for breeding or feeding stock are in-weighed; butcher cattle and fat cattle are out-weighed.

From mid-morning on, the restaurant draws a steady stream of customers; at noon the long plank counter is jammed. Here, as elsewhere about the plant, there is little formality. The farmers call the waitresses and each other by first names, and the good-natured banter they exchange is as earthy as the soil itself. Five varieties of meat are on the menu; nine kinds of pie. Coffee is served with rich cream and if more is desired, "askin' gets it."

At 1:00 o'clock, Colonel Howard Titus opens the auction by beating on a gong suspended above the auctioneer's block. Titus, a genial, heavy-set, tobacco-chewing man with a warm personality, peels off his yellow pigskin gloves, loosens the tie and collar around his muscular throat, and touches the curled brim of his stockman's hat in a courtly, bobbing salute to the audience. His ringman assistant, Will Leist, takes his place in the arena.

Colonel Titus has been with the company from the start; both he and Leist are rated among the top-notch auction showmen in the country. Both men have the knack of injecting humor in their harangue. They work together as a team, Titus crying his offering from the block while Leist, flourishing a heavy stock cane, backs him up from the arena below. The stock auctioneer's harangue is not unlike that of the tobacco auctioneer, but it has distinguishing variations of its own.

BIDDING is surrounded by quaint peculiarities. Often a farmer or buyer, for reasons known only to himself, will give his bid to the ringman assistant but not the auctioneer. Most buyers for packing houses and many of the farmers themselves bid so secretively that only the trained eye of the auctioneer is able to detect the bids. A raised eyebrow, a furtive finger movement, or the tugging at a hatbrim may constitute an affirmative sign.

Not all bidding is subtle, however. One ringman in Kentucky had a follower who preferred the direct approach. Whenever an animal took this backwoodsman's fancy, he made it known by letting fly at the ringman's shoes with a spurt of tobacco juice. So many were his bids, and so unerring his aim, the ringman took to wearing rubber boots in the arena.

At most auctions hogs or horses are sold first and sheep or calves next. Then come the cattle, with dairy cows first, feeder cattle next, and butcher cattle last. Auction operators say their reasons for giving hogs priority is to "accommodate buyers with train schedules to meet" or that it is more convenient for farmers. The real reason is that hogs are more susceptible to shrinkage, and the law in most states requires that all hogs be vaccinated before being returned to farms. Slaughter hogs are not vaccinated.

It is poor policy for an auction house to switch the order in which animals are sold once that order has been established. Farmers and buyers mill about as the sale progresses, moving to better vantage points in the amphitheater, visiting the stock pens, and sipping coffee in the restaurant. A switch in the order of selling would catch many farmers and buyers absent from the ringside when the animals they wanted to buy were presented.

Once under way, an auction continues until the last animal has been sold. During the heavy selling season the Scioto auction sometimes operates until near midnight. The commission prices charged by the larger auctions have been frozen by the Federal Government, and cannot be changed by the operators without permission. In addition to an established commission price, most companies also charge for veterinary service, insurance, and to provide funds with which to pay for animals that die after being accepted at the plant. For this service the Scioto auction charges one-half of one percent of the total sales.

Although there has never been an instance of an animal failing to find a buyer

(Continued to page 130)

DR. R. E. OLIVER, veterinarian at the Scioto Auction, and his helper administer a cholera shot in accordance with an Ohio law requiring vaccination for all hogs to be returned to the farm. (Butcher hogs are not vaccinated. Dr. Oliver, a lean gangly man with a friendly grin, is said to be the "Dr. Ames" of Allen Smart's novel R. F. D.

BANG'S DISEASE is like an executioneer, hungry for victims. It has no apparent effect on the general health of an animal, revealing itself only in abortions. It can clean out a herd in a short time for it is very contagious. Rigorous control measures will eliminate it.

BANG'S DISEASE

BY ROBERT GRAHAM

FROM Denmark, the land of opulent pastures and sleek, heavy-uddered cows comes the name Bang's disease, now generally applied to contagious abortion in cattle. Professor Bang, a Dane, isolated the bacillus which is responsible for more than eighty percent of all abortions in cattle. Your veterinarian may call the disease bovine brucellosis, and some of us who have trouble in remembering fancy Latin names may call it slinking-of-calves disease, contagious abortion or infectious abortion.

Whatever you call it, it's bad. In one state, Illinois, veterinarians added up the losses in one recent year and found that $4,000,000 was lost in calves alone. Additional large losses resulted from decreased milk production, breeding troubles, and valuable cows sent to slaughter. It is the bogey that hangs around in the shadows of every herd and haunts the herd owner at nights.

The brucella germ, both the swine and bovine type, is one of a relatively few which attack both animal and man. It has been identified as the cause of a disease in man known as undulant fever. Supposed by our ancestors to have been caused by poisons generated in swamps, undulant fever is no joke and is difficult to treat. Entry of the germ through breaks in the skin and the drinking of unpasteurized milk from infected cattle are the most common channels of infection in man.

Dairymen have been the victims of a lot of hocus pocus about Bang's disease. Many have been wiped out by following uproven methods of treatment or by following the advice of cure-all remedy salesmen. The disease will respond to no known drug; it does not "run its course" and natural immunity does not follow infection, as is the case in many diseases. A certain tolerance is indicated in some

animals after the first, second, or third calf is aborted but the germ itself is here to stay unless we do something about its liquidation. Nature alone seems unable to eliminate it.

Little headway was made against the disease up to twenty years ago and one of the most effective controls, vaccination, is not more than ten years old. There is yet much to be learned, and while it is now possible to eradicate it from a herd, no one method seems to be effective in all herds. Constant vigilance and a strict adherence to proven methods are demanded.

It is sound medical practice to identify a disease before treating it. Even if your cows are aborting, they may not have brucellosis but at this point it would be wise to test for it. Abortions are caused by other diseases and by injuries but it would be better than a race horse gamble to play safe by testing for Bang's.

The most accurate and practical way to identify the presence of brucellosis in a herd or in a single animal in the herd is by the agglutination test. This test is made by mixing a suspension of the brucella germ, the cause of the disease, with varying amounts of blood serum from the animal tested. Blood serum from normal cows has no effect on the germ suspension, but small amounts of the serum from infected cows will cause the suspension of germs to clump or aggultinate. This is no job for an amateur, but in the skilled hands of an experienced veterinarian the agglutination test has proved as reliable in detecting brucellosis in cattle as the tuberculin test in detecting tuberculosis.

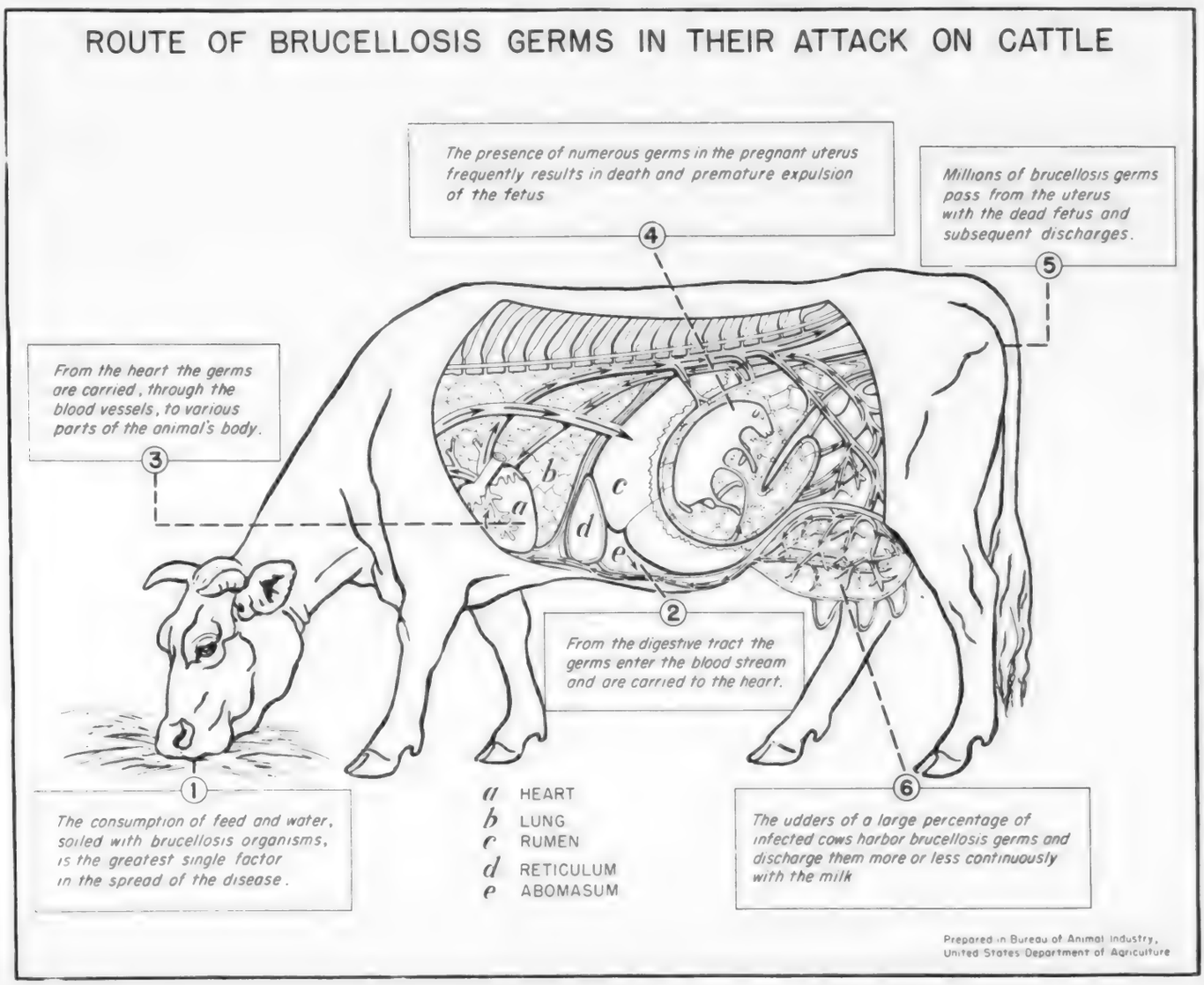
Neither test is infallible, however. Occasionally, heifers or cows heavy with calf may be infected and fail to react until after calving, but these exceptions are comparatively rare. It has also been observed that some infected animals are slow to develop agglutinins and show a positive test. Some animals that are in the early stages of the disease or that have been infected for many years may give only a suspicious, inconstant or irregular reaction. Nature often draws very fine and delicate lines and even an experienced vet sometimes feels that the only method of arriving at a decision is to toss a coin. However, by repeated testing, little difficulty has been experienced in establishing the status of every animal in a herd. One test is not as reliable or as searching as two or three tests at 30 day intervals. Accredited herds should be tested annually, and oftener if clinical evidence of the disease appears. If there is any doubt regarding the status of an animal, it is always advisable to retest and quarantine.

Prevention and Control

An understanding of the nature of cattle brucellosis and an accurate diagnosis coupled with simple preventive measures supply the requirements for checking the introduction of the disease into a herd. Neither elaborate equipment nor expensive isolation quarters are needed.

In an infected herd, the procedure to follow will depend largely upon the number and the value of the animals affected. In any herd of breeding cattle essential measures of control can usually be made a part of the management. Details can be worked out advantageously in consultation with a qualified veterinarian.

Poor-producing cows that are positive to the test for brucellosis should be sent to


ROUTE OF BRUCELLOSIS GERMS IN THEIR ATTACK ON CATTLE
The presence of numerous germs in the pregnant uterus frequently results in death and premature expulsion of the fetus
Millions of brucellosis germs pass from the uterus with the dead fetus and subsequent discharges.
From the heart the germs are carried, through the blood vessels, to various parts of the animal's body.
From the digestive tract the germs enter the blood stream and are carried to the heart.
The consumption of feed and water, soiled with brucellosis organisms, is the greatest single factor in the spread of the disease.
The udders of a large percentage of infected cows harbor brucellosis germs and discharge them more or less continuously with the milk
a HEART
b LUNG
c RUMEN
d RETICULUM
e ABOMASUM
Prepared in Bureau of Animal Industry, United States Department of Agriculture

A COW will drop her calf anywhere at any time. Abortions ordinarily occur in pasture. The spot should be thoroughly disinfected, fenced off from the herd.

slaughter. The disease does not affect their value as slaughter animals. Doubtful reactors should be kept isolated at calving time and retested at 30 to 60 day intervals until their classification has been established. In some herds containing a limited number of reactors of unusual value for breeding purposes, it may be a distinct advantage to isolate the reactors for a time rather than to dispose of them immediately. This is risky business, however, especially if the infected cows are not isolated and quarantined at each calving.

Cows affected with brucellosis probably do not acquire immunity in the true sense. They do develop a tolerance to the disease and calve normally, usually after the first or second abortion. Nevertheless, many infected cows, even though they breed and reproduce normally, are spreaders of the disease at the time of calving. The herd owner must be alert in handling and isolating these animals. In one herd made up entirely of reactors, breeding and calving records during a period of five years showed that 25 cows (39 per cent) aborted once; four (6.25 per cent) aborted twice; four aborted three times; and one aborted four times. Calves do not inherit the disease.

To provide effective control, clean and disinfect the premises where an abortion has occurred, and burn all aborted material. For cleaning contaminated premises, use 1 pound of lye to 20 or 30 gallons of boiling hot water. After the surfaces are washed, spray them with a disinfectant. Compound cresol (U.S.P.) 3 per cent, or its germicidal equivalent, is effective, but its odor is likely to be absorbed by the milk. For this reason chlorine preparations are preferable.

If the abortion takes place in a pasture, sprinkle the area thoroughly with quicklime. An abortion in the barn necessitates the thorough cleaning and disinfection of all floors, sidewalls, gutters and mangers. If the aborting cow has been isolated, it is only necessary to clean and disinfect the stall and equipment when the animal is removed. Do not place the manure on ground being used for cattle. The germ lives only a few hours when exposed to sunlight, but will live for days in a stall, during warm weather.

It's a pretty obvious warning to say that once you are rid of brucellosis in the herd you should tread lightly in buying your next cow. Your next purchase should not be pregnant, but pregnant or open, she should be tested. Pregnant cows or heifers should not be brought into the herd until they have given a negative reaction to the agglutination test 30 days after calving.

It is dangerous to add clean animals to infected herds. Likewise it is dangerous to add infected animals to clean herds. Don't do it.

The most practical way to destroy brucellosis contamination in barnlots is by plowing and cropping. Poorly drained areas should not be used for cattle.

"One of the best plans for cleaning up infected herds was formulated by Dr. Barnes of Pennsylvania. His formula, developed during the past twenty years, was put to the acid test in 94 counties in Illinois. More than 1,500 herd owners, guided by veterinarians, pooled their talents to see just what the Barnes system would do. They reached some very fruitful conclusions. Brucellosis in cattle, they discovered, can be suppressed by good management, and by this is meant testing, quarantine, disposal of reactors, and disinfection of premises. The Illinois trial indicated that (1) each herd posed a different problem (2) an ounce of prevention is worth a pound of cure (3) the disease was spread by trading and replacements (4) success in combating the disease followed those owners who showed interest in properly testing and managing their herds."

In badly infected herds the slaughter plan means going out of business. However, many infected herds have been rebuilt by raising calves from infected cows. Time to rebuild is required but valuable blood lines have been saved.

How Best to Eradicate the Disease

There is no one best way to clean up an infected herd. In herds with a small number of valuable reactors, it becomes a question of marketing or practicing rigid temporary isolation of such animals. In case a small number of reactors are kept in the herd, the major danger of spread can be largely controlled by temporarily isolating these animals two weeks before and from four to six weeks after calving. Reactors that continue to discharge after calving should not be returned to the herd. The plan of temporary isolation has been practiced on many farms with good results, and owners have thus been enabled to perpetuate certain valuable breeding strains that would otherwise go to market in the disposal of reactors. It must be recognized, however, that temporary isolation involves an element of danger; if it is not properly executed the disease may spread rapidly in a herd. Marketing reactors of low value is the surest and best

way to eliminate infection. Following the elimination of reactors, a thorough cleaning and disinfecting of premises must be carried out.

Fit the Plan to Your Herd

The success of a plan depends largely upon the care with which it is executed. A knowledge of how brucellosis spreads is the basis of any sound plan of control. However, the plan should fit the health status of the herd. Any one of three plans will, if carefully applied, yield favorable results in a majority of herds. The ultimate objective of all plans is a herd free from brucellosis.

Since brucellosis is most commonly introduced into a healthy herd through the purchase of animals which, although apparently healthy, are actually infected, emphasis must be placed upon the health status of all additions to the herd. Experience has demonstrated that it is less expensive to keep the disease out than to eradicate it from an infected herd. Experience also shows that it is advisable for an owner to raise his own replacements. In other words, herds free from the disease have often been developed from small units and have been kept free by careful management and cautious buying. Owners with free herds generally limit the purchase of breeding stock to herds that are known to be accredited. Those who take a chance often regret it.

Something New in Calfhood Vaccination Has Been Added

In 1934, the federal cattle reduction program trained its guns on bovine brucellosis. Practical experience had demonstrated that a program of control which successfully cleaned up individual herds might be extended to communities and even to counties. In Illinois and many other states testing is now in operation on an area basis. According to a recent announcement by Dr. A. W. Miller, chief of the U. S. Bureau of Animal Industry, 60 counties classified as modified bovine brucellosis-free areas in 12 states are being continued in that status for a period of three years as the result of retesting of cattle in these areas. Area brucellosis control in cattle is now being continued in 17 states and 148 counties.

The suppression of bovine brucellosis in Illinois is now organized on an area basis in 35 counties under federal-state supervision, and the services of local veterinarians, when available, are utilized. The following three separate plans of control are being used. Vaccination is optional with the owner in two of the plans. (1) Herd testing and slaughter of reacting animals; (2) herd testing with slaughter of reacting animals and calfhood vaccination; (3) herd testing with deferred slaughter of reactor animals and calfhood vaccination. The owner cooperating under veterinary supervision may choose the plan he prefers to follow. Nothwithstanding the fact that vaccination of calves is not ordinarily recommended in clean herds, this practice seems to be growing in popularity.

How Effective Is Vaccination?

Calfhood vaccination with Strain 19 is a recognized aid in infected herds. Blood tests immediately preceding and three to four weeks following vaccination of calves is optional. Calves react positively to the agglutination test after vaccination. If they do not react, following vaccination, the potency of the vaccine is questionable and they should be revaccinated. A high percentage of vaccinated calves will be negative to the blood test before breeding age. However, it seems unwise to practice calfhood vaccination with the idea that

SWINE BRUCELLOSIS can be communicated to cattle but the cattle do not return the favor. Excreta, falling on feed in the feedlot or pasture, will quickly infect a herd. Disease control must include swine. When buying hogs, segregate and test for Bang's.

THE OUNCE of prevention begins with a test, is followed by vaccination, and three or four weeks later another test. Calves react to the test after vaccination.

the vaccinated calves will withstand heavy exposure to the disease. In fact it is generally agreed that vaccination is not a substitute for sanitation and testing, but a procedure to supplement sanitary measures. Calfhood vaccination can be advantageously practiced in infected herds in which the test and slaughter plan is not desired, and especially in herds where valuable, normally breeding, reacting animals are retained to rebuild the herds.

It is not advisable on some farms to allow vaccinated calves to run with mature reacting animals. Over-exposure may alter or even overcome the protection. Calves up to breeding age are often more resistant than mature cows, and they also appear more susceptible to the disease during first pregnancy than are mature cows. There are some disadvantages in vaccinating mature animals. Such animals may react for an indefinite period. Vaccination of pregnant heifers and cows may cause abortion.

In order that the best results may be obtained from vaccination, the step-by-step procedure should be supervised by federal-state veterinary agencies to insure the health status before and after vaccination, high potency vaccine, and proper administration. Misuse and abuse of vaccination procedures may be followed by irregularities with the result that vaccination may be brought into disrepute.

Calving Time and Abortion Are Critical Periods

The greatest danger of brucellosis spread occurs when infected cows abort or calve normally. Pastures, yards, and stables often become contaminated from the uterine discharges of infected animals. Susceptible animals got the disease through contaminated uterine discharges in feed and water. Licking is also recognized as a method of spread. Bulls may spread the disease by serving discharging infected cows or through a local Brucella infection characterized by enlarged testes and cords. Healthy bulls that are allowed to serve infected discharging cows may transmit the infection on the reproductive organs at the time of service. Bulls should not be used interchangeably in healthy and infected herds. In herds where it is necessary for nonreacting bulls to serve both reactor and nonreactor cows, delayed breeding (30-60 days) should be employed. Artificial insemination of reacting cows will also reduce the danger of spreading brucellosis. Discharging cows should not be bred. Reacting bulls should not be used for breeding purposes.

How About Swine Brucellosis?

The swine type of brucellosis is also occasionally encountered in cattle, but so far as is known the cattle type is seldom communicated to swine. It is important that owners of clean herds of cattle avoid introducing the disease into the herd through the purchase of infected swine. Brucellosis in swine as well as in cattle presents a public health problem. Swine brucellosis in man is also known as undulant fever. Aborted materials of discharges from infected cows or sows should be handled with caution.

Swine brucellosis may and often is introduced into healthy herds through the purchase of apparently healthy infected gilts, sows, or boars. Aborted materials or discharges from infected animals contaminate the premises. Infected boars may transmit the disease in breeding.

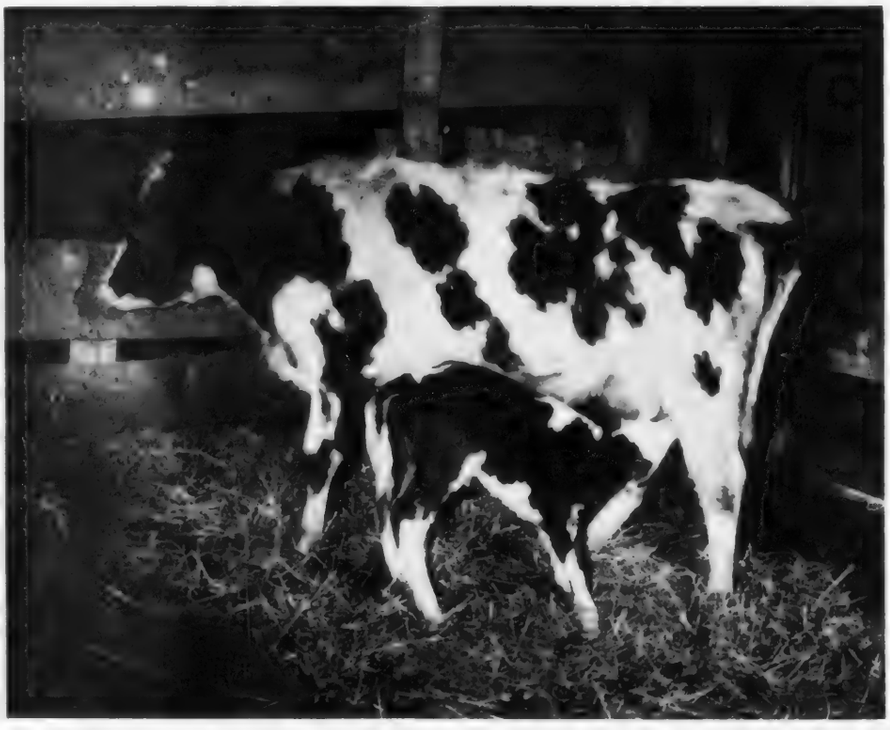
No remedy or vaccine has proved of value in the treatment of infected swine. However, the disease may be successfully prevented by a plan of swine management.

Approved methods of management, including the purchase of healthy animals, clean ground and houses, and disinfection of premises, together with the elimination of infected animals are recommended. Any sow which aborts should be isolated and not returned to the herd until proved negative to the agglutination test.

Hog houses should be cleaned and disinfected following abortions and removal of reactors. One pound of lye to 20 or 30 gallons of boiling water is a satisfactory cleaning solution. Compound solution of cresol (U.S.P.) or its germicidal equivalent is recommended as a disinfectant.

(Continued on page 135)

COWS SOMETIMES develop a tolerance and calve normally, usually after the second abortion. Nevertheless they may spread the disease at calving time.



Pleasant Valley

As "Pleasant Valley" opens, Louis Bromfield returns to live on his father's farm, after an absence of over twenty years.

I HEARD my wife saying, "What a lovely, friendly valley!"

On that late winter afternoon, one had a curious sense of being sheltered from the winter winds, from the snow, from the buffetings and storms of the outside world. My wife and George saw a snow-covered valley. They could not see what I was seeing for the Valley had no place in their memories. What I saw was a spring stream in summer, flowing through pastures of bluegrass and white clover and bordered by willows. Here and there in the meanderings of the stream there were deep holes where in the clear water you could see the shiners and bluegills, the sunfish and the big red-horse suckers and now and then a fine smallmouthed bass. On a hot day you could strip off your clothes and slip into one of these deep holes and lie there in the cool water among the bluegills and crawfish, letting the cool water pour over you while the minnows nibbled at your toes. And when you climbed out to dry in the hot sun and dress yourself, you tramped on mint and its cool fragrance scented all the warm air about you.

I saw, too, fields with fat cattle and wild marshy land where the cattails grew ten feet high and the muskrats built their shaggy round houses in the autumn, marshes which in April were bordered and splashed with the gold of one of the loveliest of all wild flowers, the marsh marigold. A little later in summer from among the rich tropical green of its spade-shaped foliage the arrowroot threw up long spikes of azure blue. And I saw the old mills, high, unpainted, silver-gray with the weathering of a hundred years, the big lofts smelling of wheat and corn and outside the churning millrace where fat, big

From Louis Bromfield's book, "Pleasant Valley." Illustrated with scenes made by photographer Joe Munroe at *Malabar*.

THIS IS BOB, one of the mainstays at Malabar. He might be your neighbor—a man from whom you can borrow a mower or ask to help you put in the last load of hay. He has the dignity, the self-assurance and the unaffected pride of a man born and bred on the farm.

AT MALABAR we try to grow nearly everything and buy as little as possible at the store.

I meant to have a few guinea fowls and ducks and geese and turkeys which could live off the abundance of the farm. I meant to have grapes in abundance and plums and peaches, currants, gooseberries, asparagus —indeed a whole range of things which could be had for the mere planting and the expenditure of a little work and care.

We built a pond to produce a constant supply of fish, and operated the maple sugar bush again. Several hives of bees fertilized the seed crops and produced hundreds of pounds of honey. ⟶

carp and suckers lay in the deep water to feed on the spilled grain and mash.

And I saw not the winter-naked woods, all snow and edges of pink sandstone rock, but whole fields of dogtooth violets and trillium and Canadian lilies and Dutchman's-breeches and bloodroot. And in summer the same woods were waist high in ferns and snakeroot and wild grapes hung down from among the branches so that the whole woods seemed a tropical place like Brazil and Sumatra. As a boy in these woods I had pretended that they were tropical forests and that I was lost in them, as very often I was. And now I knew I was right. I had been far in the years between. I had seen tropical forests in Malabar and Macassar which held the same feeling of dampness, of fertility where, as in these Ohio woods, the leaves and tendrils and fresh green shoots were so thick that the whole air seemed green as if one were under water.

And I saw the woods in late February and March when there were no leaves on the naked trees and here and there in damp hollows the first lush green of the skunk cabbage was thrusting through the dead leaves and marsh grass of the year before. For me there is always something exciting and especially beautiful about the skunk cabbage. Boldly it thrusts its tropical green leaves into the frosty air of dying winter, the first of spring plants.

That time of bareness when the skunk cabbage first appeared was the time of making maple syrup and I saw the sugar camp with its roaring fires and the woods streaked with the last melting snow and the fat horses steaming as they drew the sled which carried the great hogshead of fresh sap taken from the budding trees. And the long nights when the run was good and I was allowed to sit up all night with my grandfather and boil syrup while the fire made shadows on the oaken walls of the sugar camp and the wind howled outside.

I was seeing all this which the two others could not see. My heart was crying out, "Wait until spring comes! If you think it is nice now, you will see something you cannot even imagine when this country awakens."

IN my boybood all the barns had a rich, well-painted appearance. Those owned by farmers with an ancient Moravian background outdid the barns which only had a single stallion or bull painted on them; they had painted on the big sliding barn door a whole farm landscape for which the farm itself had served as a model and in it appeared bulls and cows, calves and stallions, hens and ducks and guinea fowl, horses and sheep and hogs. They were hex-paintings and their roots lay, not in Ohio or even in the coastal states, but far back in the darkness of medieval Germany, in a world of Bald Mountains and *Walpurgisnächte*. They were painted there on the big barn doors as a safeguard against the spells of witches, against vampires and incubi for it was believed and it is still believed among the old people that the spell cast by any malicious neighboring witch on the cattle in one of these great barns would fall not on the cattle themselves but upon the representations painted on the barn door. Always they were painted artlessly by someone on the farm and some of them had a

fine primitive quality of directness and simplicity of conception.

As a boy I had seen in the early mornings little heaps of corn or corn meal outside each door of a barn owned by some old man whose Moravian blood took him far back into the mists and shadows of Germany. A witch confronted by a heap of corn could not go on with her evil purpose until she had satisfied her curiosity by counting every grain. If the corn were ground into meal, so much the better for the task became a thousand times more difficult.

All these memories came flooding back during the short walk from the house to the great barn. Then I pushed open the door and walked into the smell of cattle and horses and hay and silage and I knew that I had come home and that never again would I be long separated from that smell because it meant security and stability and because in the end, after years of excitement and wandering and adventure, it had reclaimed me. It was in the blood and could not be denied.

The Farm: A Fortress of Security

I had memories of the farm of my grandfather, a farm which in itself was a fortress of security. On a hundred acres he had raised and educated eight children, strong, healthy, constructive citizens. He had bought little more than salt, coffee, tea and spices. All else he had produced out of the earth he owned and cherished, and when winter came there was a great cellar stored with home canned goods, and a fruit cellar heaped with apples, potatoes and all kinds of root vegetables. In the dry cold attic hung rows of hams and flitches of bacon. In that house I ate as well as I have ever eaten anywhere in the world. I knew that he had spent little or nothing upon food for himself, his wife, his eight children, his hired man and girl and all the relations who were always staying in the big house.

Opposed to that memory was the knowledge that scattered over the whole of our nation were thousands of farms where the farmer and his wife bought the bulk of their food out of cans off shelves in town grocery stores, very often in the very midst of the gardening season. The extreme examples were those one-crop area farms where wheat, or corn or tobacco or cotton grew up to the front door and the farmer's wife bought canned peas and beans in June or July or August. To our astonishment, we found that after the first year we came back to our farm, neighbors from farms, good farms, with two hundred or more acres of land, came to us to buy apples because they had not even one apple tree on their land.

The economy of a piece of land is at once a complicated and a simple economy. The farmer's land is his capital. If he does not produce all that he can produce within economic and climatic reason, he is failing to utilize his capital to its full advantage. Whatever he buys that he is able to produce can only appear on the red side of the ledger at the end of the year.

A *GOOD* farmer is always one of the most intelligent and best educated men in our society. Few great leaders ever came out of city slums or even suburbs. In France, in England, in America, wherever you choose to turn, most of the men who have molded the destinies of the nation have come off the land or from small towns. The great majority of leaders, even in the world of industry and finance, have come from there. As a nation we do not value our farmers enough; indeed I believe that good farmers do not value themselves highly enough. I have known all kinds of people, many of them celebrated in many countries, but for companionship, good conversation, intelligence and the power of stimulating one's mind there are none I would place over the good farmer.

But there are two other qualities, beyond the realm of the inquiring mind or the weight of education, without which no man could be a good farmer. These, I believe, are born in him. They are a passionate feeling for the soil he owns and an understanding and sympathy for his animals. I do not believe that these traits can be acquired; they are almost mystical qualities, belonging really only to people who are a little "teched" and very close to Nature itself.

MARSH MARIGOLDS
One of spring's first flowers.

Often enough people discover late in life that they have these qualities, without ever having known it. They did not acquire them suddenly; they were always there. It is only that through the accident of a fishing trip or the purchase of a farm, they discover them. I have any number of friends who spent all their lives as bankers and industrialists or workingmen or insurance salesmen, only to discover at middle age that in reality they were farmers all the time, without knowing it. I know of no human experience more remarkable than that of men whose whole existences are changed and enriched by the discovery late in life that they have a close bond with the earth and all living things, and that they have lost vast and intangible riches by not making the discovery when they were younger.

Conversely, there are many men on farms in America who have neither that love of soil nor of animals. They are the bad farmers who have done us such great damage as a nation. They do not belong on farms. They are there, most of them, because they were born there and have not the energy to quit and go to the cities and factories where they properly belong. There are too many of them in America, and they have cost us dear.

For the good farmer, his animals are not simply commodities without personality destined only to be made into pork chops or beef steaks or to produce milk all their lives. To a good farmer, each animal has its own personality. A good farmer cannot himself sleep if his animals are not well fed and watered and bedded down on a cold winter night. Watch any good farmer showing his sheep or cattle or hogs at a county fair or an international stock show and you will understand how much he respects the animals that are linked into that chain of life which explains and justifies the whole of his activity. Or watch any 4-H club boy or girl with tears in his eyes when the moment comes for him to part with the fat steer he has raised and brought to a cattle show. He has slept in the straw in the stall beside his steer for days. The steer is a part of the richness of his own existence. He will go cold himself or go without food and water before the steer shall be deprived of these things.

I know today that any good farmer has to be a little "teched" and when I go over the list of good farmers I know, there is not one of whom it could not be said, "He is a little 'teched'," for it means that he loves his land, his animals and his trees and understands them all. He farms not in order to make money but because of the pleasure and the satisfaction there is in it, because it is a destiny he would not change for any other in the world. Success and profit follow, but they are merely incidental.

And that, I think, is a rule that holds through all of life; the ones who set out in life with the sole object of "getting rich" rarely succeed in their ambitions, and as a rule they lead narrow, pinched hard lives unilluminated by the warmth of idea or ideal. They remain shallow egotists, isolated both from man and Nature. The man who has set money as his only goal and failed is the bitterest and most perverted of all specimens of humanity. In our soil we found not only security but the best life in the world.

IN PLEASANT VALLEY, on many of the big sliding barn doors whole farm landscapes are painted artlessly with a fine primitive quality of directness and simplicity of conception.

THERE are those who leave their winter fields bare to wind and frost and rain. They will tell you that you are crazy, that they have no erosion on their flat land. When a farmer in the South, the East or the Middle West, tells you that he has no erosion by wind or water on his bare fields and that it is unnecessary to take any precautions, you may put him down either as ignorant or a fool. The truth, which any man can see, is that a bare field is abhorrent to Nature and she sets about at once to blanket it with vegetation or to destroy it. Winter-bare corn, cotton and tobacco fields cost this country annually millions of dollars in the loss of soil.

About twenty-five years ago there began a spontaneous movement toward finding a system of agriculture more suited to the American climates and soils than that imported from Europe. It came none too soon.

Slowly but certainly a system of agriculture suitable to the United States has been evolved. It has grown out of the remote past of Asia and the Near East, out of discoveries made in half the nations of the world, out of experiments and the brains of countless devoted and intelligent workers. The system includes terracing and cover crops, trash farming, proper drainage and forestry practices and pasture treatment, the use of legumes as green fertilizer, diversified farming and the rotation of crops. The revolution is still in progress, growing and expanding. It is not only important to the people of this nation, but to the people of other nations with similar problems of soil and climate. South Africa, Palestine, China, Mexico, even so new a country as Venezuela, have called for and received the aid and experience of Drs. Bennett and Lowdermilk and their staffs from our Soil Conservation Service. Perhaps of all the aid given so lavishly to foreign nations by our government, none will prove so valuable as that given, without fanfare, without special reward, by the men of our Soil Conservation Service.

To many a reader it may seem fantastic to talk of shortages of food in the United States. No doubt it seemed foolish to talk of such things in India or China a few centuries ago, but today half the populations of India and China are born and die without ever having had enough to eat one day in their lives. If today you shut off countries like Denmark or Italy or England or Germany from outside markets, the diet of the peoples of these countries descends to the level of malnutrition

and even starvation. In all those nations there is not enough good land to feed their populations, In some of them the good land never existed. In others, as in India and China and southern Italy and North Africa, the good land was destroyed by the natural processes of erosion, by bad agriculture and by the dislocation of populations which follows wars and revolutionary changes.

Nearly all of these forces are at work in this country, some violently, some in an imperceptible fashion. Despite all assertions to the contrary, despite all the talk of abundance, despite extraordinary production records of the farmer, we have not been able during the war to provide all the food necessary to keep the diet both of servicemen and civilians on the level to which this rich country was accustomed in peacetime. There have been from time to time shortages of milk, of meats, of eggs, of vegetables and fruits, all of those high-protein foods which provide the energy and create the physique for which Americans, as a race, have been famous, those high-protein diets which can alter the very physique and character of second and third generations descended from undersized stock in Europe. A nation's intelligence, and initiative is no greater than the citizens who go to make it up, and the individual is no better than the food he consumes and the soil on which he lives. The poor physique and intelligence and initiative of the southern Italian, the North African, the poor white and the share-cropper of our Southern states is born of poor diet and worn-out soil, dereft of the phosporous, the calcium, the minerals which go to make better physical strength and intelligence and good citizenship. As our soil grows depleted, as our diet becomes more limited, the stamina of a nation or an individual goes downhill. The evidence that poor soil makes poor people and poor people make poor soil worse and so on *ad infinitum* is written across the face of the whole of the earth and of mankind itself.

In our own country there is no more virgin, well-watered land available. Land that can be irrigated or drained is not always good agricultural land, and often enough in our West, the very water used to irrigate the land is so alkaline that it ruins the soil within a few years. Fully a quarter of our good agricultural land has been already reduced to the lowest status, fit only for reforestation and sometimes not even fit for such a purpose. Fully another quarter is in an intermediate stage of destruction. There has been much talk of settling returning veterans on the land, but what land? The good land is not for sale or if for sale it is expensive land. There are no great prairies with deep, black soil waiting for settlement to absorb returning soldiers as it absorbed them after the Civil War.

Meanwhile our population continues to increase while the productive capacity of our land decreases rapidly. It is probable that not 5 per cent of our agricultural land produces anywhere near the 100 per cent of its potentiality. It is also probable that about 70 per cent of our agricultural land produces not 30 per cent of its potentiality. The farmer's problem is not entirely one beyond his control. Much of the rural poverty and insecurity arises from the fact that there are too many bad and careless farmers and too many lazy ones who are content to live as their pioneer grandfathers and great-grandfathers lived, working during the crop season on single cash crops and sitting by the stove or in the village store all through the winter. Their forefathers had deep virgin soil which could support that sort of existence and when the land wore out they could go elsewhere. Today in order to succeed, no matter what the prices or the parity support, a farmer has to be both intelligent and informed and to work and work intelligently with good modern farm machinery. This is no longer a new country with limitless resources. Each day conditions come nearer and nearer to approximate those of Europe with respect to agriculture, population and economic security. This need not be so; it is so largely because we have been wasteful and reckless in the treatment of our natural resources.

If a good man or good men have farmed soil for a hundred years or more, it will still be rich and productive land. On the other hand, if shiftless greedy men have exploited it, there will be little left that is any longer worth anything either to the owner or to the nation.

THE MASON PLACE. For three generations, a family mined the soil of the Mason farm, taking away its richness and fertility without replenishing. The land gave way and then the buildings and then the people. Now it is vacant.

NATURE never was a single-cropper and if a field is allowed to return to a state of Nature, certain plants will usually be found growing together. I know of no better example of this than the natural white clover and bluegrass rotation so common in our country. If a field of even moderate fertility is allowed to return to Nature in the form of pasture—that is if one ceases to cultivate it and turns the cattle in—white clover and bluegrass will make their appearance, perhaps together at first and then as the nitrogen in the soil becomes slowly exhausted, the bluegrass will begin to wane and at last virtually to disappear. Then the native wild white clover will take over and for two or three years it will reign until through the tiny nodules in the roots it will restore the nitrogen. Next the bluegrass begins to reappear and choke out the clover. For two or three years the pasture will be largely bluegrass until the nitrogen again becomes exhausted and the white clover moves in again.

Certainly there are other affinities in the crop world. One of them is unquestionably in our observation that between soybeans and corn. Again the observation of this fact came about by the accident of the two

crops becoming mixed where two fields overlapped. Where they happened to grow together on the overlapping strip both soybeans and corn were sturdier and healthier than in the immediately adjoining fields where they grow separately as single crops. The next year we drilled soybeans in the same rows with corn and cut them together to put in the silo and made the finest of balanced silages for both dairy cows and beef cattle. The results were the same as in the accidental experiment; both crops were sturdier and healthier than when grown separately. We have gone further and drilled soybeans not only in the rows but between the rows of corn at the final cultivation. The results are good and fairly conclusive and the resulting ensilage can scarcely be improved upon for beef cattle. The hay beans grow three to four feet in height, even producing small atavistic tendrils, indicating that once long ago the soybean was a climbing vine and the production of seed is considerably higher than that of hay beans grown separately as a single crop.

The reasons, I think, are fairly obvious. The beans planted were tall hay beans, not those grown for grain. The hay beans have roots that thrust deep, sometimes as deep as thirty inches, especially when grown with corn, and being a legume the roots are covered with scores of little nitrogen-fixing nodules. As the hay beans are cut green before the beans have ripened, there is little of the drain upon minerals in the soil which occurs during the ripening process. We have thus used soybeans to replace the ordinary field weeds as a soil cover. The hay beans not only put nitrogen in large quantities into the soil but serve to shade it, keeping it cool and moist and to shatter the great, heavy raindrops of July and August and reduce them to a mist which the thirsty soil can absorb. The reasons why the hay beans benefit the corn are easy enough to discover but why the corn benefits the beans, I do not know, unless it is that they like the cool of partial shade during the hot months. All this comes within the realm of the affinities between plants about which too little is known and concerning which too little research has been made. I only know the fact of which my eyes are the witness. We have achieved a better balanced ensilage, grown a greater tonnage upon the same acreage, and benefited the soil by an increase in nitrogen, conserved rainfall, and checked row-crop erosion, all by the utilization of an affinity between plants.

The city farmer is not content with farming as his grandfather farmed. He does not consider it good enough. City farmers are looking for new and sound ideas in agriculture. They are making experiments of great value which the average dirt farmer is unwilling to make either because the experiments represent financial risks which they dare not take or because they lack the initiative or the energy to make them.

ON the hill across the Valley stands a big fourteen-room brick house and near it what is left of a big barn. The big house, built of pink brick burned on the place, stands empty, the broken windows staring out on ragged deserted fields grown up with goldenrod, poverty grass and sumac. Last year the big barn, tired and deserted for too long, collapsed. In the Valley it is known as the Mason place.

The place is owned by a man who lives in a distant city. He keeps it for sentimental reasons because it is the cradle of his family in the rich Middle Western country. Last year he revisited it and after seeing what we had done to restore farms like it, he offered us the farm, rent free, in the hope that we should by good practices restore some of its value. Today it has none. It produces nothing. No one wants to buy it. If it were offered at sheriff's sale no one would make an offer. We went over it carefully and came to the conclusion that it was not even worth fencing in order to pasture sheep. That farm is finished, fit only for reforesting in pine trees. A few hardwoods — beach, maple and oak have seeded themselves in the gullied fields, but they do not flourish. There is too little soil.

The place haunts me. Occasionally in the night I wake up and think about it— the big, beautiful brick house, dead and half ruined and the vast barn, a collapsed heap of firewood. It is like too many farms in America.

Slowly I have been unearthing its past. In the Valley it is not too difficult to do because there are still old people who remember a long way back and have not forgotten the stories told them by their fathers and grandfathers.

There is nothing very unusual about the history of the Mason place. It is the history of millions of other farms in America.

The house was built in 1820 about fifteen years after Ezra Mason, his wife and ten children came to settle in the Valley. It was forest country and that pioneer family cut off the virgin trees, piled them in great heaps and burned them. When the trees were cleared away there remained about ten inches of rich black forest loam, the residue of a million years of growth and decay. It grew wonderful crops and in a few years Ezra Mason and his sons burned the bricks which built a handsome house and a big barn to shelter the cattle, sheep, horses and hogs during the winter months.

Ezra died at last and he left the farm to his oldest son and divided his money among his other children. There was enough for each of them to go further west and establish themselves on rich new farms of their own. The wealth came out of that thick, rich black loam and served to develop more American resources. It helped to build the nation.

Ezra's son carried on and built additions to the big brick house and the barn. There was a little less soil. It had been farmed greedily and much of it left bare to the elements had washed away, but there was still enough for Ezra's son to follow his father's example. He left the farm to his eldest son and divided his money. His children went west to Iowa and Wisconsin, to Kansas and Missouri.

With the third generation there was less soil and less money. Two or three of the children went to the city. In the fourth generation there was still less soil and less money. And then the Masons moved away altogether and left the place to tenants who farmed it greedily and carelessly, and at last there came a day when no tenant wanted it and the fields were rented out to neighbors who took everything off the land they did not own and put nothing back. The good loam topsoil was almost gone. It remained only at the bottom of the fields or in the depressions. Every-

MALABAR in the Spring looks like a picture post card.

where there were gullies. And then came the final stage, when the land was no longer worth plowing. Tramps and squatters lived in the house until the roof decayed and then they too moved away, and the Mason place died.

A farm like the Mason place makes you do a lot of thinking. At one time that land supported as many as twenty people, providing them with good food, with clothing. From it well-nourished, sturdy children went to school and to the Valley church. It produced and sold eggs, butter, milk, beef, pork, sheep, wool, chickens and grains of all sorts. It deposited money in the banks and borrowed money on which it paid interest. It bought books, clothing, farm machinery, lightning rods, harness, carriages, organs and any number of things. Each year the money it spent in the neighboring town found its way into banks and circulated over the whole of the nation. From among the well-nourished children there came a bank president, a Senator, a governor and any number of schoolteachers and lawyers and general good citizens. All of that came out of the rick black loam it had taken Nature a million years to create. Once the Mason place was a rich economic asset to the nation.

Today it is a tragic liability. It buys nothing. It produces nothing. Its worn-out deserted fields contribute their share of runoff water to floods which every year cost the nation millions of dollars' damage. It is only by chance and sentiment that it pays any taxes, and even the taxes are not paid by that land but by a factory in town hundreds of miles away.

When you think about the Mason place you can't help thinking that there are three or four million other farms in the same condition scattered over the whole of the United States, farms which are no longer economic and social assets but grave liabilities. Another million or two are on the way to becoming liabilities.

Their problem is not that merely of booms and depressions. It is a result of the permanent illness of the land and of American agriculture itself.

A good deal more than half our population lives on farms and in villages and small towns dependent upon agriculture for their economic existence. While there are ups and downs in agricultural income, our land steadily grows poorer.

Across our Valley stands the gaunt, empty, beautiful brick house of the Mason place, and each morning when I look across the Valley and see it, I think of all the things I have written about. The Mason place stands there as a symbol of our wasted and dying land, of our sick agriculture. There is not one citizen in the whole of the United States who is not affected by the Mason place, by the disaster it symbolizes in taxes, in higher living costs, in economic depression, in water supply, in floods and in thousands of ways because now, as since the beginning of time, in this nation as in every other, soil and agriculture are the foundation of everything.

We know, now, that poor worn-out land make not only poor crops and scrubby cattle; it makes poor, underdeveloped, undernourished people as well. The great problem of American agriculture is the decline of human stock through the decline in fertility and mineral content of the soil itself. "Poor land makes poor people" is a saying every American should have printed and hung over his bed.

BETWEEN the ROWS of wheat there is no barren soil that loses its tilth when water strikes it. These strong young shoots of winter wheat come from land that is rich and moist, not by chance, but by a way of farming. The seed bed was prepared by discing and stubble mulching; there is the crop residue of five years on top of the soil, and the moisture of the spring rains to feed it. Shaded and guarded by the thick residue, the moisture will be available when it is needed to swell the grains.

BETWEEN LOUIS BROMFIELD and daughter, as with every good farmer and his young ones, there is rooted an affection that comes from tending the land together. In the spring their bare feet grow to snow-shoe-like proportions planting the last hundred strawberry plants in the pelting rain. There are new-born lambs to find in blackness of a cold April night; the garden to care for on hot summer days. These and a hundred other farm chores bring the farmer and his daughter a simple understanding of nature and each other; the barrier of age is forgotten. ⟶

A WHEAT FIELD in late June, just before it flowers. It will ripen fast in the next week or ten days, be cut in early July. This is spring wheat, the predominating type in the midwest and a segment of the corn-wheat-hay-hay rotation cycle.

Our Daily Bread

By T. A. KIESSELBACH

FROM wheat are made both bread and cake. Bread is the staff of life for the masses; cake the age-old symbol for the privileges of the rich. The tyrant knows that as long as the bellies of the peasants are filled with bread he will be permitted to eat his cake in peace. Plenty of wheat means plenty of bread and plenty of bread means peace and a contented land.

Christopher Columbus brought seed wheat to the new world on his second westward voyage. In his mind was a dream of permanent settlements, tilled fields, and an empire which he knew could not prosper without bread. Thereafter it was customary for colonists to bring their seed wheat with them. Wheat followed the pioneer as the frontiers were pushed from the east to the middle-west and on to the Pacific coast.

The mechanization of American farms came on fast during the 1880's. Before that date most of the wheat had been cut by hand and threshed by flail and crude machinery. Between 1840 and 1880 horses were replacing the oxen as farm power. Following the reaper, and in recent years the combine, wheat has spread westward over the Great Plains and is now concentrated in Kansas, Nebraska, Oklahoma, Texas and the Dakotas. Spring wheats pioneered this westward march. It was not until late in the century when Mennonite settlers from Russia brought Turkey wheat into Nebraska and Kansas, that winter wheat was sufficiently hardy to be trusted in this dry and rigorous climate. This hardy wheat with this 50% higher yield revolutionized production in the Central and Southern Great Plains. Later Russian introductions were known by their native points of origin; they are Crimean, Kharkov, Malakoff, and Yaroslav.

Wheat, Wheat Everywhere

Wheat is grown in almost every state. In 1945 there were 65 million acres planted in wheat. This yielded an all-time record of 823 million bushels of winter wheat and 300 million bushels of spring wheat. Five distinct commercial types predominate. These types have regional adaptation and are recognized under the official grain standards of the United States. The five classes and their percentage of acreage are as follows:

(1) Hard Red Spring, 21% grown in the north central states where winter temperatures are too low for the survival of winter wheat. The varieties are: Mida, Pilot, Rival, Thatcher, and Newthatch.

(2) Durum Spring Wheat, 5% grown in the same general area as Hard Red

Spring wheat. Varieties are: Pentad, Kubanka, Mindum, Monad, Acme, and Nodak.

(3) Hard Red Winter, 47% grown chiefly in the sub-humid to semi-arid south central states. Varieties are: Pawnee, Comanche, Westar, Wichita, Tenmarq, Blackhull, Cheyenne, Nebred, Oro, Minturki, Newturk, and Yogo.

(4) Soft Red Winter, 20% grown in the eastern states and Missouri and eastern Kansas. Varieties are: Thorne, Trumbull, Fairfield, Fultz, Fulcaster, Leap, Poole, Mediterranean, Currell, Nittany, Early Premium, Clarkan, Harvest Queen, Red Rock, Fulhio, Gladden, Flint, Red Heart, and Purple Straw.

(5) White, 7% grown in the far western states and New York and Michigan. Varieties are: Goldcoin, Baart, Federation, Dicklow, Quality, Dawson, and Honor.

The primary use of wheat is for bread, although some is fed to livestock and some has certain industrial uses. The American people are very particular about their bread and the milling and baking industries have set up rigid standards and techniques. The Hard Red Wheat of both winter and spring types is in greatest demand for milling into flour for the baking of light bread. In this wheat is found a strong gluten and high protein content coveted by the baker. The Soft Red and White varieties are low in gluten and high in starch content and are not suitable for cakes, cookies, crackers and breakfast cereals. Durum wheat is used for macaroni.

Science Goes To Bat

The first seed wheat brought to America from Europe found it tough going in the new world, but gradually it was adapted for conditions in this country. About 50 years ago the science of genetics made its first excursion into the subject of wheat. Since that time, plant breeders have developed varieties for every use, for every climate and every soil condition. The plant breeder knows, for instance, what varieties are most resistant to leaf rust, stem rust, bunt and loose smut and those that are most resistant to the hessian fly and saw fly; also what varieties are most winter hardy, lodge resistant, and shatter resistant; which ones have heavy test weight, good color and desirable milling and baking characteristics. These various characteristics may be bred to any degree into a type of wheat adapted to any region.

Wheat knows no state lines, and areas of adaptation frequently differ even within a state. The grower should make certain, by consulting his County Agent, of the suitability of a new variety for his farm. The history of a new superior variety, the Pawnee, will illustrate how a new type is established.

Pawnee, a Hard Red Winter wheat developed cooperatively by the U. S. Department of Agriculture and the Kansas and Nebraska agricultural experiment stations, was released in the fall of 1942. It is now

FOR 3,000 YEARS the sickle and the cradle were the only harvesting tools.

SEVENTY YEARS AGO a crude reaper edged out the cradle on a few eastern farms.
A FEW YEARS LATER wheat acreage surged forward with the invention of the binder.

THE FIRST THRESHER was an awkward mechanical flail powered by a treadmill.

AN IMPROVED THRESHER was powered by horses, separated the grain from the straw.
THE STEAM ENGINE replaces horses and there was less backache at harvest time.

in great demand in eastern Nebraska, eastern Kansas, and southwestern Iowa. In experiment station tests during 9 years in eastern Nebraska it averaged 32 per cent higher yield than Turkey wheat which has been the standard for many years. Under the conditions prevailing in this territory, Pawnee is far more resistant to leaf rust, loose smut, and hessian fly and it ripens earlier which reduces losses from stem rust, hail damage, heat, and drouth. It is more lodge resistant and tillers more profusely. Its milling and baking characteristics have been proved satisfactory to the trade and therefore there is no impediment to its general adoption in this area. It is estimated that one and one-half million acres were planted to this variety in the fall of 1945.

Twelve years is about the minimum from an initial cross, through the necessary period of selection, testing, and seed increase to the time of distributing the seed of a new variety.

Hybrids between wheat and rye have been made for the purpose of getting a more hardy wheat, but the crop so far has been unsatisfactory. Perennial wheat has been attempted at several experiment stations by crossing with the native perennial wheatgrasses. Nothing practical has yet come out of this work although crosses between these species have actually materialized. Russia has publicized widely successes in the development of perennial wheat, but it appears that no one in the United States has had evidence of its satisfactory performance.

Crop Rotation for Wheat

The first concern of the wheat grower is the seed he plants, but conservation of the soil and maintenance of its productivity should rate fully as important. Through a well planned sequence of crops, field sanitation reduces the incidence of plant disease, insect epidemic, and weed infestation. These pernicious robber pests accumulate under continous one-crop systems but are discouraged by diversification. Through the judicious use of forage legumes placed at intervals between other crops, not only is high-protein roughage produced for livestock, but much needed organic matter and available nitrogen are added to the soil. The tilth, water-intake, and productivity of the soil are thereby greatly increased. On the older soils that have been cropped a hundred years or more, as in Ohio, Indiana, and Illinois, it is not uncommon for wheat yields to be doubled following a forage legume, and 50% increases are frequent. Even on the newer land of eastern Nebraska, increases of 25% are common. A higher protein content in Hard Red Winter and Hard Red Spring wheats is obtained when nitrates are plentiful in the soil.

The best legumes to plant with wheat are red clover, ladino clover, sweet clover, alfalfa, and lespedeza. All are effective rotation and forage crops in those regions to which they are individually adapted.

COMBINES, ponderous but efficient machines, cut the wheat and thresh it in one operation. They expanded the wheat fields of the west and made America the "Bread Basket of the World." Tractors have replaced horses or mules, which once pulled them.

Farmers know through experience which are best for their fields. In some sections a mixture with grass is desired. When used for pasture this tends to reduce the danger from bloat in cattle and sheep.

A stand of the legume is commonly obtained by seeding early in the spring into the oats, barley, or fall sown wheat that serves as a companion crop. The grain yields are not noticeably reduced thereby and the legume stand is obtained with no additional loss of time or expense except for the cost of seed and labor of sowing. Under the drier conditions of the Great Plains, oats or barley sown at two-thirds the normal rate are to be preferred to wheat as a companion crop as they provide less severe competition for the legume seedlings.

The exact sequence of crops and length of the rotation depends upon what local experience has shown to be the most profitable. The following rotations, showing the crop sequence in successive years, are practical and profitable but may be modified to fit the local needs.

(1) Corn, corn, oats, wheat and red clover, red clover for hay and seed.

(2) Corn, corn, oats, wheat with red clover and timothy, red clover and timothy for pasture 2 years.

A HANDY VERSION of the combine, operated by two men, for the small farm.

THIS SCENE will be rare when the combine reaches its full possibilities. Now most midwest wheat is cut, shocked in the field, and threshed at a convenient time later.

(3) Corn, corn cut for silage or fodder, wheat and red clover, red clover.

(4) Corn, soybeans, wheat and red clover, red clover.

(5) Corn, corn, oats and sweetclover, sweetclover for pasture or seed, wheat, wheat.

(6) Corn, oats, wheat and sweetclover.

(7) Alfalfa 4 years, corn, corn, oats, wheat.

(8) Corn, wheat and lespedeza, lespedeza for pasture, hay or seed, wheat.

(9) Corn, wheat and lespedeza, lespedeza.

In the Great Plains where moisture deficiency is almost always a limiting factor in production on non-irrigated land, care must be exercised not to use legumes excessively in the rotation. If too high a state of fertility is created the succeeding crops grow ranker, require more moisture, and may therefore be subject to greater damage. The eastern farmer with ample rainfall is seldom bothered by such a complication and may believe this suggestion a little far-fetched.

In large areas of dry land agriculture in the Great Plains, it has not been found practical to include forage legumes in the rotation because of difficulty in obtaining and maintaining stands. Summer fallow is introduced into the rotation in the drier sections. The purpose is to store in the subsoil the rainfall of one crop year to supplement that of the next year in which a crop is grown. The fallow is commonly followed by one or two years of winter wheat, and then by corn or sorghum and barley. Wheat and fallow may be alternated for many years without other crops.

Land Fertilization

Vast areas of eastern wheat land need frequent fertilization with barnyard manure or commercial fertilizer. Where the legume in the rotation does not supply sufficient nitrogen, and other nutrient elements are not lacking, this element may be added profitably to the soil before the wheat starts to joint in the spring. About 40 pounds of nitrogen per acre is considered a normal application. To supply this amount, 95 pounds of Uramon (urea), or 125 pounds of ammonium nitrate, or 250 pounds of sodium nitrate are required. These nitrogen carriers are superior to ammonium sulphate for use on small grain.

Phosphorus is most commonly deficient in soils of the eastern United States and is profitably applied in the form of superphosphate at the rate of 200 to 300 pounds per acre. Soils of low fertility respond profitably to applications of potash but the need is seldom sufficiently great on clay or loam soils.

Mixed fertilizers are designated by formula as 4-12-4, the respective numbers always referring to the percentages of nitrogen, available phosphate, and available potash, in the order named. Where sufficient nitrogen is supplied by the legume in the rotation, a 0-14-6 fertilizer may be applied profitably on many soils at the rate of 200 to 300 pounds per acre. In large areas the wheat is indirectly benefited by lime application which reduces excessive soil acidity and thereby provides more favorable growth of the legumes.

In the Great Plains area, two considerations have kept commercial fertilizers from coming into common use on non-irrigated land: First, the land is relatively new and serious lack of fertility has not generally become pronounced; and, second, frequent moisture deficiency operates to the disadvantage of high fertility. The time is approaching, and on some farms is already here, when additions to the native fertility will bring profitable crop response. Systems of livestock farming are most successful as they provide for the return of crop residues and barnyard manure to the soil. In occasional years with a cold, wet spring, bacterial activity within the soil becomes depressed and nitrates fail to develop in adequate amount. The young growing crop shows this need by assuming a light yellow color. Moderate nitrogen fertilizer applications on such wheat in the early spring are likely to prove profitable.

Seedbed Preparation

An all important principle in the seedbed preparation for winter wheat, is that soil moisture and nitrates are conserved for the crop by the control of weeds and volunteer grain. The longer such control can be provided between harvesting the previous crop and planting the new, the better are the prospects for a favorable yield. Where wheat follows small grain, the recommended practice is early plowing followed by supplementary tillage as needed. In the more humid eastern states plowing with a mould-board plow is preferred as the crop residues are incorporated in the soil thereby, resulting in faster decay and liberation of plant nutrients. In the sub-humid and semi-arid regions it makes

little difference what tillage implement is used provided a satisfactory control of the weeds and volunteer grain are obtained. Throughout the Great Plains the plow, the one-way disk, and the duck-foot tiller are all popular. There is rightly less insistence in these parts on a thorough incorporation of the crop residues as their use in surface protection against erosion, rainfall runoff, and soil-moisture evaporation may more than offset the advantages of speedy decay. In Kansas and Nebraska many years of research have shown that early seedbed preparation, as described, gives 50 to 75 per cent greater yield than is obtained from land prepared just ahead of planting.

The preceding crop influences the time and manner of preparing the land for wheat. In the eastern United States much of the winter wheat follows corn or soybeans. Corn land that has been cut for silage or shocked fodder may be prepared by disking. Soybeans often leave the land weed-free and in good condition for drilling to wheat without special preparation. Unless the soybeans or corn can be harvested at least a month before the optimum time to sow wheat, maximum yields are not to be expected and another rotation or crop sequence is likely to prove more profitable.

Early seedbed preparation for winter wheat has the additional advantage of permitting the soil to settle naturally by action of rains. Compact seedbeds are far less conducive to winterkilling of the crop than is a loose soil.

Since spring wheat usually follows corn, seedbed preparation for it naturally becomes a job for spring. Very early seeding is distinctly advantageous. Therefore rapid procedures are advisable, and the corn stalk ground is merely double disced before seeding. Experiments have shown satisfactory results from such methods, and the greater certainty of early seeding without undue delay from rainy weather gives them a strong endorsement.

Favorable crop response to suitable and timely tillage is so great that it is easy to understand why the early agricultural scientist, Jethro Tull, mistakenly said that "tillage is manure." Tillage research has clearly demonstrated, contrary to early opinion, that deep plowing for wheat is seldom advantageous and the greater depth is accomplished only at a needless and costly expenditure of power. A nine-inch depth was once a common recommendation. Now it is known that depths of 5 to 7 inches are adequate over the entire wheat-producing area. The wheat roots are by no means restricted to the cultivated upper soil. In the Great Plains it is common for the roots to extend to a depth of at least 6 feet and to draw upon moisture to that depth. Most of this root growth is made through hard subsoil that never has known the plow.

To Sow or Not to Sow

In the states east of the Missouri River, formal planting plans may be carried out with far greater regularity than is advisable in the drier areas of the Great Plains Due to frequent loss of wheat from drouth, these dry-land farmers need to be guided in their planting by the amount of soil moisture they have been able to conserve. Because of the great depth of root

A BENEFIT of threshing wheat out of the field is the pile of straw for bedding and shelter near the barn. Many feedlots are based on the strawpile, which goes back to the fields again as manure. Disadvantages are: Loss of grain from shattering and weather; the extra labor needed at threshing time; and the added man hours required for the extra operations of shocking, threshing, and hauling, which a combine eliminates. Threshing is a social event and in spite of the hard work most farmers enjoy it.

WHEAT is given only a cursory grading at the local elevator and prices tend to flatten out over an area. The farmer with top wheat rarely receives the maximum price. Buyers for the big mills make a thorough test. Here a car is being sampled by a U.S.D.A. inspector who wants to see what is on the bottom of the car.

penetration, moisture accumulated in the soil before planting is as helpful to the crop as the rain that falls during its growth. If this stored up moisture does not extend to a depth of approximately 2 feet at planting time, the yield expectancy is very low and best judgment dictates "to leave the seed in the sack." The chances are better for a later crop such as sorghum or corn. If the soil is wet four or five feet deep at planting time, the prospects for a wheat crop are excellent. It is under these conditions that 30 to 50 bushel yields are grown.

Seed Treatment

The chief advantages of running seed through a fanning mill before planting are: removal of weed seeds and smut balls of covered smut; removal of trash that may interfere with uniform seeding; and removal of broken, diseased, and extremely shrunken kernels whose only value is use as feed. The mere grading of wheat to separate out the heaviest and largest seed for planting is not important under normal farm conditions. A reasonably clean, sound, good-quality, bin-run lot of seed wheat is seldom made more productive by fanning-mill grading.

Seed treatment to control bunt or stinking smut should be practiced universally wherever this disease occurs. The simplest and most satisfactory treatments consist of thorough dusting with either *New Improved Ceresan* or *copper carbonate,* using prescribed dosages. Grain yields are reduced almost in proportion to the percentage of smutted heads occurring in the crop. Many fields have been observed with as high as 25 per cent of bunt. Proper disinfection gives essentially perfect control except in certain sections of the Northwest where the infection may come from soil-borne smut spores.

Another type of seed treatment with plant hormones for physiological stimulation has been suggested by some. Such practice is discredited by sound research and the wheat grower may add to his profits by avoiding the expense.

Timely Planting

With fall sown wheat there are three primary factors to be considered in deciding when to plant: (1) Sufficient time should be provided to enable the plants to become well established before winter sets in, as this insures better stand survival. (2) Unduly early planting causes excessive fall growth with its accompanying needless waste of soil moisture. (3) In states like Kansas, Nebraska, Iowa, Illinois, Indiana, and Ohio where wheat often is subject to more or less serious loss from hessian-fly infestation, it is advisable to delay seeding until after the "fly-safe" date has been announced officially by the County Agent. As a result of this delay, the wheat does not emerge until after the egg-laying season of the fly has passed and does not become infested. Early destruction of all volunteer wheat plants is

A KING SIZE drill will shorten the labor of sowing but a tractor will shorten it still more. Wheat needs a well-cultivated, but not deep, seed bed. The use of a plant hormone treatment for seed wheat appears from experiments to be love's labor lost.

recommended as a means for combatting this pest.

It is not uncommon in years of fly epidemic for the yields of susceptible varieties to be cut in half because of planting one to two weeks before the fly-safe date. Fortunately, the fly-safe date is normally consistent with what would otherwise prove to be the best time to plant.

The early planting of spring wheat is recognized as a very important yield factor. It provides for the early growth under fairly low temperatures which are conducive to tillering. The crop also heads and ripens earlier, reducing the hazards of rust, drouth, and heat damage. It is not uncommon to lose a bushel in yield for every three days delay in planting beyond the optimum date.

Manner and Rate of Planting

The manner of planting has come to be fairly well standardized for large regions. Drilling is almost the universal practice and with winter wheat has proved decidedly more productive than broadcasting. It results in more prompt and uniform germination. In case the seedbed has become superficially dried out and the dry period is prolonged, getting the seed into moist soil with a drill may mean the difference between success and failure. The gain from drilling is distinctly less with spring wheat because soil moisture conditions are usually favorable at that time of year.

Standard row spacings of grain drills are 6, 7, and 10 inches. Six or 7 inches is considered most suitable, except that under semi-arid conditions a spacing of 10 inches is at least equally good. Wheat roots are able to occupy the soil fully at any of these row-spacings up to 10 inches. In the eastern states better weed control is obtained with the narrower spacing.

In the western portions of the Great Plains, furrow drills have come into fairly extensive use. There is, however, uncertainty as to superiority over the standard surface drill. The ten-inch semi-furrow drill has much in its support under semi-arid conditions. Among other considerations, the seed is more likely to be placed in moist soil when this type of drill is used. The depth of planting should seldom exceed one to two and one-half inches. There is danger that the seedling may not be able to reach the soil surface from excessive depths.

An excess of seed beyond what is actually needed in most years is commonly and preferably sown as a matter of stand insurance. A fairly wide range of planting rate is permissible, as stand adjustments through tillering are made by the

crop in response to the degree of plant competition. For the eastern states 6 pecks of seed per acre is most satisfactory except that 7 pecks may yield more if the seed is very large. In the eastern part of the Great Plains 5 pecks is the standard rate. With reduced rainfall westward, the optimum rate decreases to as low as 2 pecks per acre.

Management of the Growing Crop

There is a common belief that winter wheat may be pastured by livestock without injury to the crop, and that such feed is obtained without cost. This has proved true with rank growing wheat on fallowed land in the western Great Plains if done in moderation and discontinued in early spring at least 2 weeks before jointing begins. In all winter wheat territory, under occasional conditions of excessively rank growth, grazing is likely to prove beneficial and provides much feed besides. The outcome depends upon whether serious lodging would have occurred without the pasturing. The effect of pasturing is to reduce the rankness of growth and lower the chances of severe lodging with its accompanying loss of yield.

Under average wheat conditions grazing will usually reduce the yield of grain. It is especially harmful if cattle are allowed on the wheat when the soil is wet or if pasturing is continued too late in the spring. At the latitude of Lincoln, Nebraska, the wheat begins to joint and the young heads emerge from below the ground level about April 25. Grazing off these young heads prevents further growth of the culms so affected and the yield must depend upon the tillers which develop later and yield less. Yields are often lowered 20 to 40 per cent without farmers being aware of the cause. For the owner-operator of the farm, this loss may be offset by the gain in livestock, but the absentee owner should consider this in the rental arrangements.

Very rank growing wheat on excessively fertile land that threatens early to be a near or complete loss because of its inability to stand, may often be clipped to advantage with a mower. When such wheat is about 12 inches tall it may be cut with the mower sickle set six to eight inches high, leaving the clippings unraked. Such treatment reduces the vegetative growth and lodging tendency, and improves the yield and quality. Mowing should be done only where experience suggests that the lodging would otherwise be serious.

Harvest and Safe Storage

After three to four months of spring and summer growth comes the golden harvest. There is always suspense and anxiety until the crop is in the shock or in the bin. Loss from shattering wind, or hail are remote possibilities. Long continued rain may lodge the crop, promote interfering weeds, and bleach the grain. (When the wheat stalk gives way and the plant falls down it is called "lodging".) Unfavorable possibilities tend to encourage harvest before the crop is fully ripe, thereby reducing the yield of grain. This loss approximates 5 per cent for harvesting 3 days prematurely, and 10 per cent for 5 days premature cutting. On the average, the entire development of the grain requires only about 30 days from the time the flower is fertilized and the beginning of the kernel is ushered on its way. It pays to hold up harvest until the crop is ripe, when it is in the stiff-dough stage. Approximately a week later the shocked grain is sufficiently cured for threshing.

For combining, the grain must be thoroughly dry. The moisture content should be down to at least 14 per cent for safe storage in the bin. Moisture tests to serve as a guide may be obtained at local elevators. With a higher moisture content, wheat is likely to heat and become musty in storage and reduce in milling value and price. There are also frequent cases of loss of germination and seed value as a result of heating. The only safe procedure is to permit the grain to stand in the field until thoroughly dried out. This normally requires at least 5 days to a week after the crop is ripe enough for the binder.

The concaves, working parts and cylinder speed of the thresher should be adjusted with great care to prevent loss and cracking of the grain and to do a thorough job of cleaning.

Because ripe wheat is subjected to additional weather hazards by prolonged standing in the field, it is a point of efficient management to get the combining done at the earliest possible hour after the moisture content of the grain will permit. Where there is uncertainty about the keeping qualities of the stored grain, the wheat should be examined to a full depth in the bin during the first few weeks of storage and moved if excessively warm. Taking such a sample is simplified by use of a grain probe which may usually be borrowed from the County AAA office.

Marketing

Wheat is priced by the manager of the local grain elevator primarily on the basis of physical grade. The price is discounted progressively for deficiency in soundness, test weight, and purity with respect to admixtures with other types of wheat, rye, and any other foreign matter. These factors influence the yield and quality of the flour and thus provide some compensation for doing an especially good job of wheat production. But they do not provide an adequate appraisal of the important varietal differences in wheat.

THE WHEAT BLOSSOM is one of nature's most delicate flowers. It remains in full bloom only a few minutes, but in those fleeting moments the pollen is shed, fertilization takes place, and the anlage of life stirs in the blossom. A separate flower blooms on each spikelet.

A MAN who works in the wheat all day knows what it takes to place bread on the tables of the world. After he has pitched sheaves all the long afternoon, he comes in from the field, tired, hot and sweaty; he shakes the chaff out of his pants and digs beard out of the back of his neck; he sloshes his head in a pail of cold water, and as he dries himself on the roller towel he gets a whiff of vittels from the kitchen. He looks out over his fields, sees the stack of new straw, and says to himself—"Well, the blankety-blankety wheat's in for the year."

Cows Do Well on Timothy

BY E. B. POWELL

It is high time that a champion appeared for that good old American feed, timothy hay. It has always been a staple feed for both horses and cattle but it has never been very popular for cows because of a general belief that it reduces milk production. Dairymen have continued to feed it, however, because in times of scarcity of other types of hay, timothy has been easy to get and plentiful. It flourishes on so-called sour land where other hays fail, and its generous root system will suck nourishment from the thinnest of soils. It seeds easily, the seed is cheap, it spreads over waste land, kills out weeds, and reseeds itself.

Chemists say there is really nothing wrong with timothy hay as a feed for cows. It contains no known toxins and it can be and is being successfully fed to dairy cows by many dairymen. It is what timothy lacks rather than what it has that makes it poor feed. If properly supplemented to make up for what it lacks, dairy cows will do well on it.

Agricultural scientists have found, by extensive tests under conditions found on the average farm, a way to supplement timothy which will compensate for these lacking qualities.

When poor results are obtained from timothy, one or more of three conditions are present. First, it is not correctly supplemented. Second, the hay is poor. Third, the cows are poor. A poor cow will not produce well even if she is fed caviar and a good cow will go downhill if she is fed poor feed.

The first of the deficiencies of timothy hay is its protein content. In arriving at the proper supplement to make up for this deficiency, we shall assume that we have good hay to start with. The protein content of timothy is highest when it is mature. If it is allowed to mature before it is cut, it shatters easily and for this reason it is often cut too green for its maximum protein content.

Even in the best timothy hay, the protein content is far below that of alfalfa and clover. The average protein of alfalfa is 10.6%, while that of timothy is only 2.9%. If the dairyman makes up this difference by feeding a protein concentrate, he should at the same time add carotene, in which timothy hay is also deficient. Carotene, pro Vitamin A, is expensive and difficult to handle in concentrated form. The best way to supply this deficiency is to add enough ground corn and cob (corn is high in carotene) to a 24% protein concentrate, to bring the concentrate down to a 16% protein concen-

trate. To do this, add 80 lbs. of ground corn and cob to 120 lbs. of the 24% concentrate.

The lack of carotene often causes weak calves and trouble at calving time. This is often mistakingly thought to be due to a toxin in timothy, but in reality it is due to the deficiency of carotene. A calf will fail to survive indefinitely on a milk diet, not because of a toxin in milk, but because of what the milk lacks.

Because timothy hay is less palatable than alfalfa and clover, the cow eats fewer pounds of it.

The palatability of any feed is an important factor in cattle health. H. B. Ellenberger, head of the Department of Dairy Husbandry, Vermont Station, found that his cows consumed 25 pounds of good quality roughage as readily as they consumed 15 pounds of poor quality roughage. At the Purina Research Farm, records kept on several groups of dairy cows showed that they ate daily, per 1000 pounds live weight, 25 pounds of alfalfa hay, but when timothy was substituted they ate only 18 pounds. On the basis of actual consumption then, cows will consume about 40% more alfalfa or clover hay than they will timothy hay, both hays being of equal quality.

Not all the hay eaten is digested. The part digested is called by the professors, "the total digestible nutrient," or T.D.N. This the cow requires in addition to proteins. When a 1000 pound cow eats 25 pounds of alfalfa hay, she takes in 12.58 pounds of total digestible nutrients; when she eats 18 pounds of timothy, she takes in only 8.44 pounds of digestible nutrients. It is obvious then that when you are feeding a supplement to timothy hay, the amount of that supplement should be based not only on the difference in the protein and carotene content of alfalfa and timothy, but also on the difference in the amounts of each that a cow will eat. The usual feeding standards almost always overlook the factor of palatability, and they compensate only for the difference in nutrient content and not for the difference in volume. The additions of proteins and carotene on the basis of the difference between the protein content of timothy and alfalfa isn't enough. We must compensate for the total difference, by weight, of what the cow eats of the two, because this affects the total digestive nutrient requirements.

Most of the familiar feeding standards fail to take this into consideration. One standard says to feed 10 pounds of 16% concentrate to each pound of butterfat. Another standard says to feed one pound of concentrate for each 3½ pounds of 4% milk. They add up to the same thing and almost all of them recommend feeding more concentrate when the roughage is poor, but this does not take care of the over-all deficiencies caused by the cow eating less timothy.

A COW will eat twenty-five pounds of alfalfa at a meal but under the same conditions she will eat only eighteen pounds of timothy. The timothy is less tasty.

IF PROTEIN in the form of concentrates is added to timothy in sufficient amount to make up for the difference of protein content between eighteen pounds of timothy and twenty-five pounds of alfalfa, condition and milk production will not suffer.

Let's take a specific instance. You have a 1200 pound cow producing 35 pounds of 4% milk and you are using the standard that recommends feeding one pound of 16% concentrate for each 3½ pounds of milk produced along with all the hay the cow will consume. You are using the typical concentrate composed of oil meals, mill by-products, molasses, etc. According to Morrison, this 1200 pound cow producing 35 pounds of milk daily should receive each day for body maintenance and milk production 2.4 pounds of digestible proteins and 20.63 pounds of total digestible nutrients. This standard calls for 10 pounds of 16% concentrate a day regardless of what hay she is fed. If she is fed alfalfa hay, however, she will eat more of that and her total intake will be 4.50 pounds of digestible proteins and 22.55 pounds of total digestible nutrients. But she needs only 2.48 pounds digestible protein and only 20.63 pounds of total digestible nutrients. A comparison of the two shows that she is overfed, receiving 2.02 pounds more than she needs of digestible proteins and 1.92 pounds more than she needs of total digestible nutrients.

Now, let us feed her timothy hay. At the same time we will increase the protein to a 24% type, the usual method of making up for the low protein content of the

AT ONE TIME there was more timothy grown than any other hay. The acreage planted has declined in recent years, last year to 6,139,000 acres while 42,000,000 acres were planted to lespedeza, 15,701,300 acres to alfalfa, and 12,280,000 acres to red clover. It grows over a wide area, flourishes on soil too sour for other hays, reseeds itself well, kills out weeds and spreads fast. Its generous root system sucks nourishment and moisture from thin, dry soils. Seed costs are low in comparison. On the negative side of the ledger is its comparitively low nutrient value. The protein content is only about a third of the protein content of alfalfa, red clover, and alsike. Yield of timothy hay per acre averages 1,800 pounds while alfalfa yields 4,333, red clover 3,200, and alsike 2,000. Timothy hay sold for $13.50 per ton last year, alfalfa for $17.50 and red clover for $16.50.

timothy. This would give her a total of 2.55 pounds of digestible protein or .07 pounds more than she needs of that, but even with the 24% concentrate it will give her only 17.71 pounds of total digestible nutrients, or 2.92 pounds less than she needs. She is underfed. It is obvious that by feeding a stronger protein content, we more than make up for the protein lack, but fail to make up for lack of total digestible nutrients.

Let's try another method for meeting the total digestible nutrient requirement, and at the same time meet the protein requirements also. In place of feeding her 24% concentrate with timothy hay, let's give her four pounds more of the 16% concentrate. For example, if we feed her 14 pounds of 16% protein concentrate and she eats 21.6 pounds of timothy hay, her protein needs will be met as will those of her total digestible nutrient requirements. *This then seems to be the standard to be used when feeding the cow timothy hay.* This shows that even if a 16% protein concentrate is fed it will meet her total digestible nutrient requirements as well as her protein requirements. The trick is to increase the amount of 16% concentrate rather than to increase the strength of the concentrate. The addition of corn to dilute 24% concentrate to 16% will not throw your values out of balance.

Usually, as the protein of a concentrate is increased the total digestible nutrients increase slightly but not significantly. Feeding a higher protein concentrate at the usual rate will not meet the total digestible nutrient requirements of a cow and she suffers from malnutrition on timothy hay. Some dairymen contend that in spite of the above fact, they still want to feed a high protein concentrate with timothy hay in order to meet the total digestible nutrient requirements. This is O. K. as long as it's fed in sufficient amounts to meet the total digestible nutrients required. The extra amount of protein resulting from this will do no appreciable harm even though it is not needed.

If the dairyman wishes to maintain milk production and good health in his cows, he must feed concentrate in sufficient amounts with timothy hay to meet the total digestible nutrient requirements *as well as* the protein requirements. This is the basis for all failures to properly supplement timothy hay. Reducing the formula to terms of pounds of feed and milk production, the cow should receive one pound of 16% concentrate for each 2½ pounds of milk produced if she is to fill her needs when she is fed timothy hay. The cow receiving alfalfa hay needs but one pound of 16% concentrate for each four pounds of milk produced.

The cow cannot read an analysis tag. She is just a milk factory. She takes what we give her, to the best of her ability, converts it into milk and butterfat. The only way she can tell us that her ration is deficient is in her production and condition.

THESE TWIN HEIFERS were identical in size. In tests both were fed the same amount of concentrate. The larger was fed alfalfa, the smaller timothy. Had the smaller been given enough additional concentrate to make up for the protein lack in timothy she would not now be in poor condition and low in milk production.

HOW TO SUPPLEMENT TIMOTHY

DAILY NEEDS OF A 1200 POUND COW

	Digestible Protein	*T. D. N.*
For body maintenance	.76 lbs.	9.29 lbs.
For 35 lbs. of 4% milk	1.72 "	11.34 "
Total	2.48 lbs.	20.63 lbs.

IF FED 10 LBS. OF 16% CONCENTRATE WITH ALFALFA

	Digestible Protein	*T. D. N.*
10 lbs. of 16% protein concentrate	1.32 lbs.	7.46 lbs.
30 lbs. alfalfa hay	3.18 "	15.09 "
Total intake	4.50 lbs.	22.55 lbs.
She needs	2.48 "	20.63 "
Receives excess	+2.02 lbs.	+1.92 lbs.

IF FED 10 LBS. OF 24% CONCENTRATE WITH TIMOTHY

	Digestible Protein	*T. D. N.*
10 lbs. of 24% concentrate	1.92 lbs.	7.56 lbs.
21.6 lbs. timothy hay	.63 "	10.15 "
Total intake	2.55 lbs.	17.71 lbs.
She needs	2.48 "	20.63 "
Receives excess protein, deficient T.D.N.	+.07 lbs.	—2.92 lbs.

IF FED 14 LBS. OF 24% CONCENTRATE WITH TIMOTHY

	Digestible Protein	*T. D. N.*
14 lbs. concentrate	2.69 lbs.	10.58 lbs.
21.6 lbs. timothy hay	.63 "	10.15 "
Total intake	3.32 lbs.	20.73 lbs.
She needs	2.48 "	20.63 "
Receives excess	+.84 "	+.10 "

IF FED 14 LBS. OF 16% CONCENTRATE WITH TIMOTHY
(Correct Formula)

	Digestible Protein	*T. D. N.*
14 lbs. of 16% protein concentrate	1.85 lbs.	10.58 lbs.
21.6 lbs. timothy hay	.63 "	10.15 "
Total intake	2.48 lbs.	20.73 lbs.
She needs	2.48 "	20.63 "

BEES LIKE a little shade in the heat of the day but too much makes them testy when examined. A southern or eastern exposure, well away from buildings, is the best place for the hives. Allow plenty of working space around each hive. These hives have extra large supers.

Honey in the Comb

BY CHARLES A. REESE

THERE was a time when the farmer who raised no bees for table honey was as rare as a coon dog without fleas. Buttered-honey and comb-honey were wed to hot soda biscuits, buckwheat pancakes swam in warm strained honey, and farmwives used it lavishly in their baking. Kids loved it but were leery of honey offered to them by the spoonful because honey sometimes camouflaged—momentarily—the most unholy home-remedy concoctions ever poured into a naive gullet.

This was the general picture three decades ago. Today the ravages of certain bee diseases, insecticide programs, and the trend towards specialized farm crops, have practically eliminated small apiaries in many parts of the country. Large apiaries operated by professional beekeepers, on the other hand, have increased. In many instances the large commercial apiaries have resulted in a total bee population far greater than existed when every farmer raised bees, yet specialized crops have suffered inadequate pollination for the simple reason that commercial bees are concentrated in small areas where the nectar yield is greatest.

Agricultural agents and crop specialists, long concerned with the alarming decrease in natural pollinating agents, have done everything possible to encourage the re-establishment of small apiaries. In the past few years their efforts have met with increasing success. Many a farmer, originally interested in producing honey as a sugar substitute during the shortages, has discovered that a few colonies of bees are a profitable investment from the standpoint of pollination alone. Other beginning beekeepers have found the honey harvest from a few colonies of bees more than they could consume, leaving a surplus to be sold at a profit. A third and growing crop of enthusiastic beekeepers are farm-owning business and professional men who, though interested in the other benefits of beekeeping, find relaxation and enjoyment in a few hours spent among their hives each week.

Unlike most other classes of livestock, bees do not require constant or routine attention. While they are highly self-sufficient and almost anyone can raise them with reasonable success, careful thought should be given to the type of honey that is to be produced, the necessary equipment, the location of the apiary, and the number of colonies that are to be tended. For convenience's sake let's analyze each of these factors from the standpoint of a man who expects to benefit in three ways by raising bees: (1) by the pollinating activities of his bees; (2) the table-honey they produce; (3) the sale of his surplus honey.

How Many Colonies ?

Most experts on beekeeping recommend a start of from three to a half dozen hives. In no instance should a person with little or no beekeeping experience start out with more than ten colonies. The danger in so doing isn't so much a dollars-and-cents risk as it is a risk to the beginner's enthusiasm—without which beekeeping becomes a drudgery instead of a pleasure. The time to expand an apiary, if more than a half dozen colonies are desired, is after the operator has had time to familiarize himself with such local conditions as the prevailing honey plants, their period of bloom, and the size of a bee population they can profitably support.

Kinds of Honey

Theoretically, at least, bees don't give a second-hand buzz whether the surplus honey they produce winds up in a cellophane wrapper or a tin bucket. The chief concern of each colony is to gather as much as it can as fast as it can. How they go about storing it is up to the beekeeper who supplies the necessary materials.

Anyone who wants to split hairs can think of a dozen types of honey classified according to color, flavor, or packaging. For our purposes let's say that there are two principle types of honey, classified according to the manner in which it is stored by the bees. One of these types, the individual squares of honey known as section-comb honey, we can scratch off our list because it is primarily a commercial product. Section-comb honey must be light in color and delicate in flavor if it is to find a ready market and the results in producing it are so uncertain that only those persons who thoroughly understand bee behavior and wish to buck the commercial market should attempt it.

The other type of honey, chunk-comb honey, can be any color or flavor and is the beginning beekeeper's best bet. Unlike section-comb honey, chunk-comb honey is produced in various sizes of supers and it makes no difference if the bees leave cells empty now and then because frame units of chunk-comb honey can be disposed of in several ways.

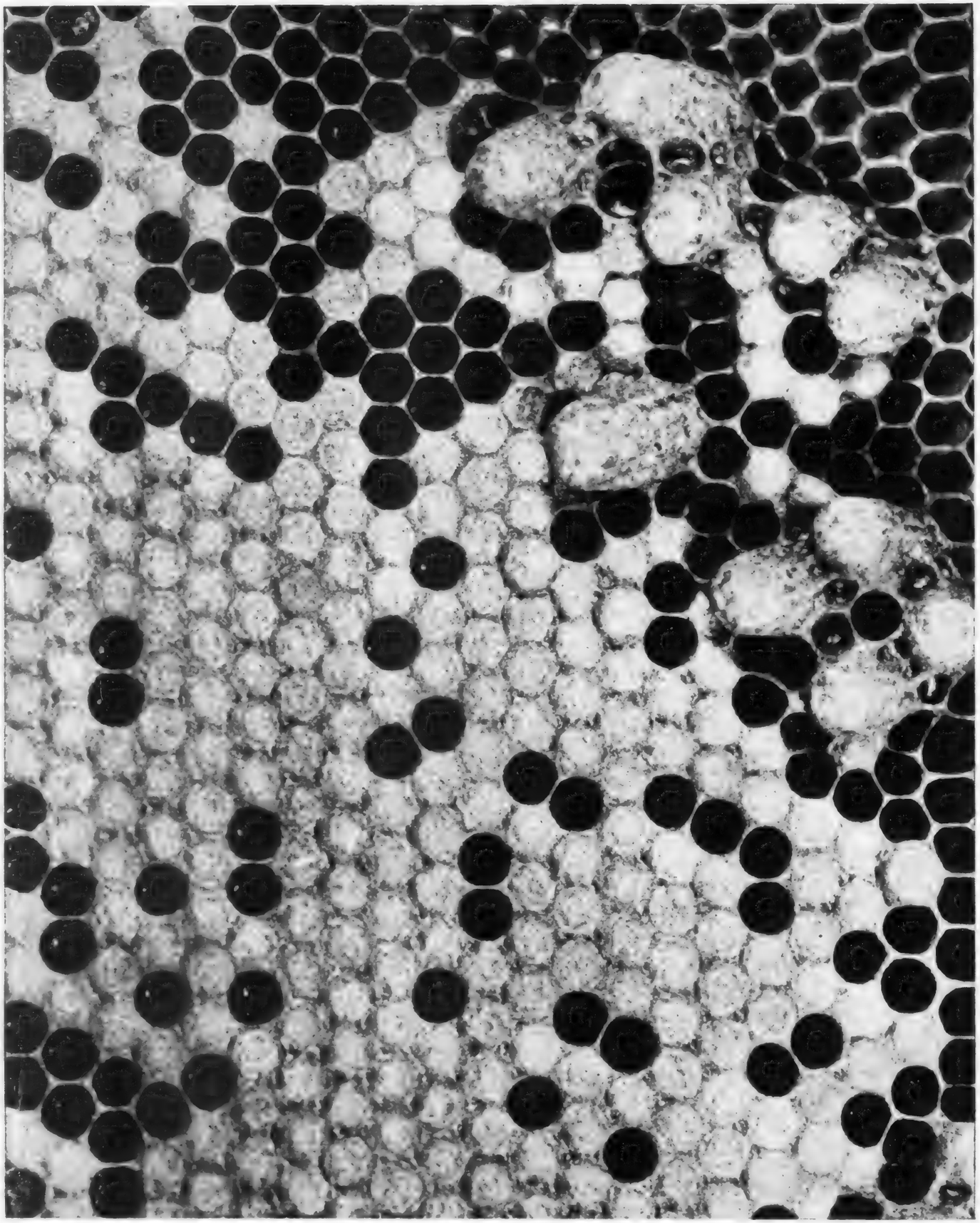
If all this talk of supers and frame units has the clarity of mud to you at this point, don't worry about it. We'll get around to each of them in turn. Right now the thing to keep in mind is that bees store honey in two places—in the main hive body (commonly called the brood chamber), and in supers, or extra boxes, placed on top of the main hive body. The honey in the main hive body is left with the colony for their winter food; the surplus honey in the super is the beekeeper's share. For convenience in handling, the surplus bulk comb honey is generally produced in supers which take frames only half as deep as those hung in the main hive body. Honey stored in frames this size can either be removed from the comb by extracting, or can be cut out and used as chunk or comb honey. Since it is hard to tell how much surplus honey will be produced, a minimum of three or four extra storage supers should be kept on hand for each colony—more if local nectar conditions show promise of an unusually heavy honey flow.

Equipment and Costs

Beekeeping materials are so cheap that shaving corners by buying used equipment is seldom worth the bother and risk involved. Second-hand hives are often odd-size in dimensions, preventing interchangeability of supers or other essential parts. Moreover, used hives are so often contaminated that a prospective buyer should be skeptical of any hive devoid of bees. Aside from buying an already established, healthy colony of bees complete with their hive, it is better to buy new materials and play safe.

Many successful apiarists recommend that a two-story, ten-frame hive be used as a brood chamber in producing bulk comb honey. Three or four extra supers (as mentioned above) will provide storage space for surplus honey and expansion of the brood nest. Factory-made hives, standardized to facilitate interchangeability of parts, will cost $6 to $8 for each two-story, double brood chamber layout. The four extra supers and a queen excluder will cost about the same, making a total outlay of $12 to $16 per hive unit. Since interchangeability of parts will save plenty of wear and tear on a beekeeper's vocabulary during the honey flow, the man who enjoys woodworking and wants to build his own equipment should first invest in a factory built hive complete with fixtures to serve

WHEN A HIVE becomes overpopulated, the surplus, led by a queen takes off to find a new home. This is "swarming." When the queen settles the swarm gathers about her in a mass and can be captured by scraping them into an empty hive with a broom.



A SECTION taken from the brood chamber, or main hive body, showing queen, drone and worker cells. The cells in the upper right corner are drone cells and are easily distinguished by their protruding tops. Queen cells have depressed tops. The white dots in the uncapped cells in the lower left corner are newly laid eggs. The development of a queen is not by chance; workers feed a selected larvae a special diet and it grows up to be a queen. The first queen to emerge from her cell stings to death all other candidates and becomes undisputed ruler. She mates once. On her mating flight she takes off from the hive, pursued by the drones. Flying high, she mates with the drone that outdistances all others. Only one drone in a hive has any fun.

as a pattern.

Approximately three pounds of bees are required to populate a hive. When purchased from bee-dealers, a three pound package of bees including a queen will cost $3 to $5. Additional pieces of essential equipment include a hive tool, a bee smoker, and protective devices such as gloves and veils. These can be purchased singly, or in kits selling for $4 or $5. If for any reason a beekeeper later decides to specialize entirely in extracted honey, he will have need of extra equipment—particularly if he produces extracted honey in market quantities. A small extractor will cost from $10 to $40; a storage tank and a double-boiler will come to approximately $12 each. In all, the special equipment for producing extracted honey in quantity will total somewhere between $50 and $100 in addition to the cost of the bees, hives, and marketing containers.

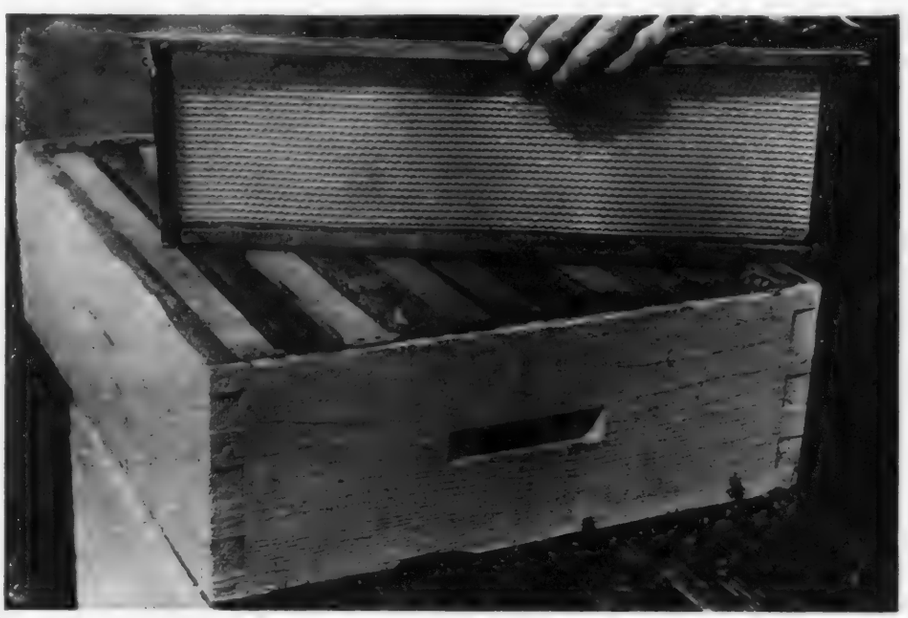
Assembling New Hives

Factory-built hives are usually received in knock-down shipments wherein the hive, frames, wax foundations, supers, and covers come in some 200 parts which are perfectly cut and ready for assembly. The manufacturer's instructions are complete and easy to follow, but the prospective beekeeper who doesn't like jig-saw puzzles will do well to enlist the aid of his wife from the start. She, of course, will ignore the instructions and assemble the works by means of that phenomena known as feminine intuition—and will probably be more successful than the boss will care to admit.

The hive is nothing more than a box built in sections and fitted with queer-looking contrivances, the purpose of which any bee can be relied upon to understand at a glance. At the bottom is a stand upon which the hive body rests. Just above the stand is the bottom board consisting of several boards cleated together to form a bottom for the hive body. Next comes the main hive body itself. The hive body, or brood chamber, is a wide, topless and bottomless box in which are hung ten wooden frames, each fitted with a factory-made sheet of patterned wax. These sheets of wax are known as comb foundation and the bees draw them into cells for hatching their young and storing winter food.

Above the main hive body goes a shallow box called the super. Like the main hive body, the super is open at top and bottom and contains ten vertical frames fitted with comb foundation. Eventually several supers may be stacked one on top of the other for it is here, you remember, that the bees store the surplus honey that will be removed. Between the main hive body and the supers is a queen excluder which keeps her majesty from crawling up into the supers to deposit eggs. On top of the uppermost super goes an inside cover; on top of this, in turn, is placed a waterproof outside cover. When the out-

THIS SHOWS the proper method of inserting package bees. The Boardman mason jar feeder is entered from within the hive and prevents robbing by itinerant bees.



QUEEN EXCLUDER, wire grill placed above brood chamber, prevents queen from laying eggs in super above. Exposed frame contains thin wax foundation for chunk honey.

PROPER WAY to examine double brood chamber hive. Exposed frame shows distinct cappings over brood (lower left), and irregular cappings over honey (upper right).

side cover is in place and the hive has been given a coat of paint, it is ready for a house warming by its future occupants.

Locating the Apiary

Once the number of colonies has been decided upon and the hives purchased and assembled, the next problem is that of locating the apiary.

Most races of bees are blessed with relatively sunny dispositions and ask little more than to be allowed to conduct their affairs with a minimum of interference. There is always a possibility, however, that an unaccountable change in temperament will suddenly transform even the mildest colony into a buzzing melee of winged furies.

For this reason it is best to locate the hives at a safe distance from pastures and other sections of the farm where livestock, pets, or humans are accustomed to roam. When there are close neighbors the hives should be so situated that the bees will not fly across the adjoining property at head level. Whenever possible, select a location where the bees can have a southern or eastern exposure, well away from walls or buildings. Bees appreciate a little shade the hottest part of the day, but dense shade makes them irritable when examined. Plenty of space should be left around each hive, for bees should never be tended from in front, or in direct line with their natural flight. Foggy sites, or locations where there is poor drainage, should be avoided.

Selecting the Bees

Bee dealers scattered throughout the United States offer several races of bees, each of which has its quota of enthusiastic champions. The race which is probably more popular than all other races put together is the Italians (not to be confused with the common Dutch or German black bees often referred to as "little black Italians").

Italians have met with favor because of their color, gentleness, thriftiness, and their general resistance to the inroads of European foulbrood and the wax-moth larvae. Of the two varieties of Italians the golden Italians with four or five yellow bands are the more gentle, but the three-banded Italians are more thrifty and better honey gatherers.

A BEE is an ornery and vindicative critter at times, at others gentle and easily managed. A good handler bathes often for bees don't like B.O. This hive is swarming.

The Caucasian bees, originally from the Caucasus Mountains of Russia, are dark colored and are presumed to be more docile and less likely to sting than some of the other races. Caucasian bees have an objectional tendency to gather an excessive amount of propolis with which they glue the fixtures of their hives together and gum up the works in general. Though Caucasians probably rank second to Italians in popularity, no new stock has been introduced in this country for many years. This is unfortunate for in crossing with other races Caucasians lose their milktoast temperament and become quite vicious.

The Carnolians, named after Carnolia where they originated, are similar to Caucasians in color but show a distinct white fringe of hair between the different segments of the abdomen. They are extremely gentle and highly prolific, but have a tendency to swarm at the slightest excuse and are hard to control. For this reason they have not been generally adopted by beekeepers.

Cyprian bees from the island of Cyprus are a beautiful, highly colored race, but are vicious and hard to keep under control. They are used primarily by queen-breeders to inject color into the race of Italians.

In most instances a beginning beekeeper's best plan is to buy a strong, disease-free colony from an established beekeeper in his locality. Nearly every state has a well-balanced bee disease eradication program which is a protection to the small operator. The services of trained and competent inspectors are always available and by making use of this service a beginning beekeeper can be certain of obtaining healthy colonies.

Because wintering in some localities presents a special problem (to be discussed later), it is often best to purchase colonies in early spring. Colonies secured then will have the advantage of starting on full-drawn combs, paving the way to building up their worker populations in time for the main honey flow. If full colonies are not available, a beginner can sometimes purchase the first swarms at the start of the honey flow. Late swarms, which emerge at the end of the honey flow, are usually returned by their owners to weak colonies in the apiary because they are of no value in starting new colonies.

When neither colonies nor swarms can be purchased locally, package bees with mated queens can be obtained from bee dealers. State apiarists, County Agents or, for that matter, any reputable apiarist, can recommend bee dealers whom they know to be reliable.

Each colony is made up of workers, drones, and a queen. The workers are in

IN NATURE'S SCHEME honey is a by-product. The main function of the bee is to pollinate the flowers of plants and trees. Seeking the nectar at the base of a flower, the bee's legs and body are covered with pollen which it carries to the next bloom it visits. Many important plants are not self-pollinating. Some pollen is wind-transported, but the bee does the best job.

the majority for they support the hive by doing all the work—gathering honey, producing wax, caring for the brood—even defending the hive. Workers are rendered neuter in gender by the type of food given them in the larvae stage. Only the workers possess stingers.

Drones are male bees, larger than workers, who merely sit around the hive and look handsome until the queen is ready for her mating flight. Drones are tolerated by the colony for propagation purposes only and are kept in a minority. When the drones become too numerous, workers thin out their ranks. This is a Kamikaze attack on the part of the workers because they commit suicide in stinging a drone to death. It is invariably fatal for a worker bee to use its stinger.

A whole article could be written about the queen alone. Briefly, the population, thrift, and strength of a colony are dependent upon her. Since she is the only bee in each colony capable of laying fertile eggs, this is her sole duty. Survival of the fittest is a rigid law with bees. When raised by the colony, the chosen larvae are given special food by the workers in order that they may develop into queens. The first young queen to emerge from her cell kills all the inmates of the other queen cells, thus establishing herself as undisputed ruler of the colony.

Package bees come in 2, 3, or 5 pound packages and should be ordered in time to arrive for the early fruit and dandelion bloom. This will insure their obtaining plenty of pollen and nectar as soon as they are placed in their new location.

Should weather conditions prevent newly arrived bees from gathering nectar and pollen in the field, they must be fed before being removed from their shipping cage. This is done by making a syrup of equal parts of sugar and warm water. When the sugar has been thoroughly dissolved, the cage is placed on its side and the syrup is painted on the wire-screen sides of the cage until the inhabitants seem satisfied.

Installing the Bees

Installing package bees in a new hive is a simple matter when the hive has been properly assembled beforehand. If the bees have been fed with syrup, wait until they quiet down before moving them. Then uncover the feeder and remove it from the shipping package together with the queen in her cage. After removing five frames from the brood chamber of the hive, either shake the package bees into this space, or set the package inside the hive and let the bees establish themselves on the comb unassisted. Next, remove the candy end of the queen's cage and hang it, this end up, two or three frames away from the package cage. In a few days the package cage can be removed and the frames replaced.

If, after installing the bees in their hive, the weather prevents their gathering nectar, sugar syrup again must be supplied. A friction top bucket with a few holes punched in the lid will do the trick when filled with syrup and inverted over the hole in the inner hive cover. An empty super added to the hive after the syrup is in place will prevent loss of heat and robbing. As soon as the bees can get nectar in the fields they will invariably turn up their noses at the syrup.

Caring for the Critters

Many successful beekeepers spend only 8 or 10 hours on a colony each year—and even then the work is light and does not have to conform to any particular schedule. The main thing is to keep up each colony's morale by keeping it healthy and strong in comparatively young bees. In this task her royal majesty the queen is the beekeeper's strongest ally. The queen is actually the soul of the colony and the production and temperament of the entire bee population depends upon the characteristics she has inherited.

If package bees have been purchased to start a colony, the chances are that they will be led by a strong, vigorous queen. In the spring of the year, a few days after the bees have been introduced to their new home, she will begin to lay eggs on an assembly line schedule of 2000 to 3000 a day. Twenty-one days later the eggs will begin to hatch and the hive will be built up to three or four times its original size. The mortality rate among bees is high, however, and a worker lives only 5 to 7 weeks during the honey flow. For this reason it is wise to keep an eye on the queen and see that she remains prolific. If she becomes sluggish or crippled, she must be replaced. When a queen is vigorous each cell in the brood nest, except for an occasional cell filled with pollen and nectar, is filled with brood and those in the same position are approximately the same age.

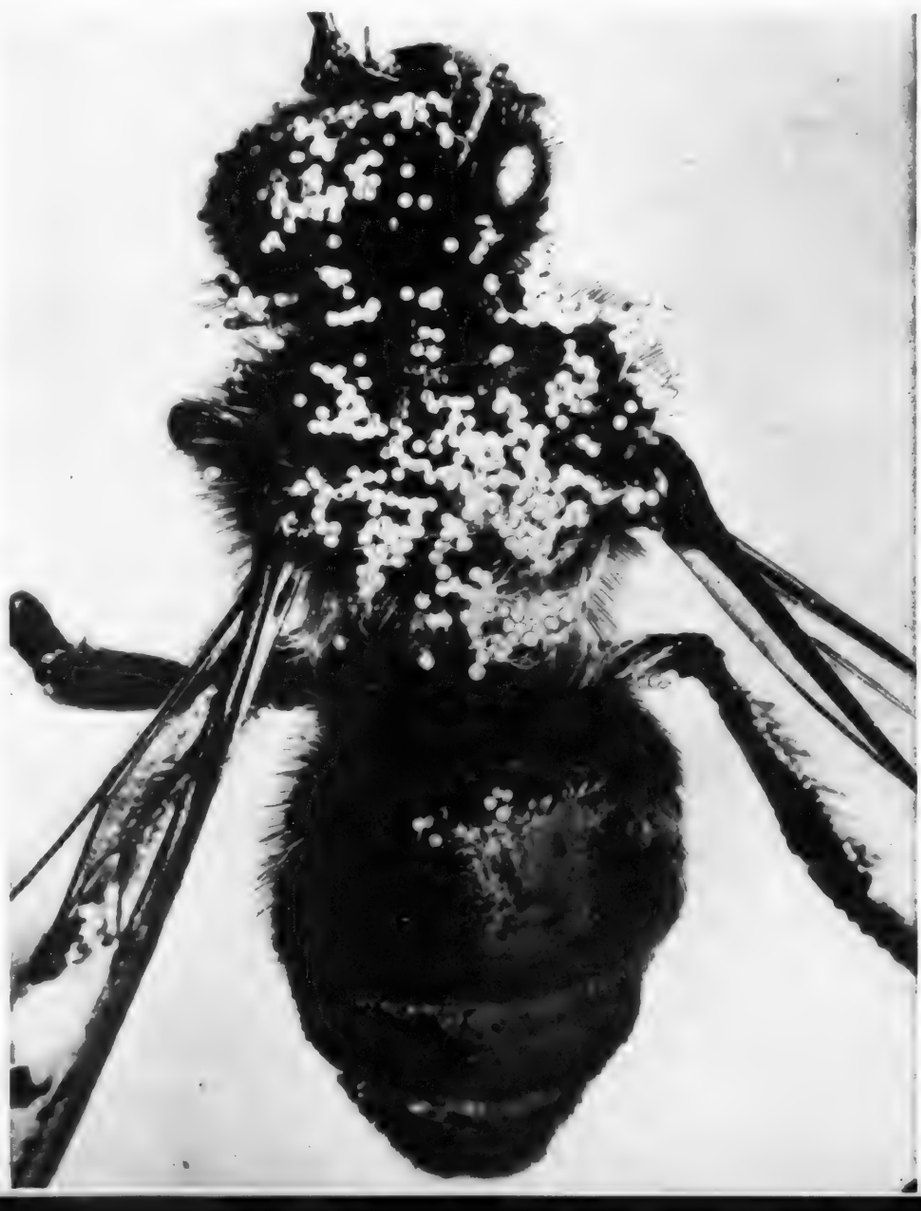
Some beekeepers change the queens in each colony every year; others re-queen systematically every other year. Requeening is usually done in the early part of the honey flow, or at the beginning of the fall honey flow. The queens themselves are either raised in small nuclei in the apiary yards, or mated queens are purchased from regular queen-breeders.

Swarming

Swarming is the bee's natural method of increasing their colonies and occurs when the old bees get fed up with the carrying's on of the younger generations and light out to seek a new home. But while swarming may be fun for the bees, it's a headache to the beekeeper if he hopes to produce a maximum honey crop. To produce a thrifty honey crop the bees must be kept united so that they have a huge field force gathering nectar at all times.

Lack of space in the hive for growing bees and storage of nectar and pollen is the chief cause for swarming. When bees begin building numerous queen cells they are literally hoisting warning signals of their intentions to swarm. Sound beekeeping practice frowns upon allowing the bees to take matters into their own hands; if the beekeeper wants to increase his colony population he should do so by dividing a colony and permitting the queenless half to raise a young queen, or by providing the queenless half with a new queen purchased for that purpose. In either case—by swarming or by dividing the colony—the surplus honey crop will be largely eliminated. The new colony will need all the honey it can gather to tide it through the winter.

If a swarm leaves a hive without a queen it will return; if a swarm leaves with a virgin queen it may join another swarm or it may accept a queen on her mating flight. If a swarm is led by the old queen it will cluster in a mass close by. The term "closeby" does not necessarily mean horizontal proximity to the old hive. Bees often exhibit what appears to be premeditated, malicious cussedness



THIS HONEY BEE has just visited a hollyhock blossom and its body is covered with pollen grains which it will distribute among other blooms it visits. Body hairs help retain pollen. The business end of a bee carries a retractable stinger in a sheath.

AN ARTY LOOKING HIVE, but not very practical. Europeans originated this straw-coiled pattern for their first domesticated bees. The swarm has to be practically dispossessed to obtain the honey. Useful only as a decoration or for bees used solely for pollination.

in their swarming habits. After attaching themselves to the highest tree limb in sight they are inclined to smirk and make snide remarks while the sweating beekeeper is trying to recapture them. Or so it is said.

Before returning a captured swarm to their hive location, the supers should be removed and the brood nest taken from the stand. The original brood nest is then used as a nucleus for some other stand or, after all queen cells are destroyed, is added to a weak colony for an extracting super. A new hive body with one drawn comb and the remaining frames supplied with foundations only is then placed on the stand and the original supers are replaced on the hive.

Winter Care

If provided with plenty of food and sheltered quarters, bees will look out for themselves during the winter months. A safe winter supply of food for one colony between November 1 and April 1 is 40 pounds of honey—or thereabouts. Colonies that do not have enough honey left after the surplus crop is removed can be given shallow supers of honey from other hives providing there is no possibility of transmitting foulbrood or other diseases in so doing. Another method of insuring an ample supply of winter food is to give the bees one or two ten-pound pails of sugar syrup during October which they will store and reduce to honey.

In the more northern sections of the country, hives can either be stored in dry cellars during the winter, or insulated against the cold with straw or chaff covered with tar-paper. The entrance at the bottom of the hive can be left open, but should be protected with wire mesh to keep out rodents. Bees create their own heat by body metabolism and the tem-

(Continued on page 140)

DETACHED AND SERENE

How To Butcher And Cure A Hog

BY THOMAS P. ZIEGLER

LIKE women's hats there's no accounting for tastes in recipes for curing pork. Some people think pork should be cured with salt alone; others insist upon adding either sugar or saltpeter, and some like a combination of all three. In the South the dry cure is popular, in the North where protection from subfreezing temperatures is important, the brine cure predominates. Hickory, oak, chestnut, apple, pecan, corncobs — each smokehouse fuel capable of imparting a distinctive flavor to pork has its quota of champions. All pork fanciers agree however, on one point: The best flavored pork is the pork that has been cured at home.

Don't Butcher Just Any Kind of Hog

The size and the breed of the hog is a matter of personal choice. Weight does make a difference, however, in the cost of the pork per pound. Growth gains are always cheaper than fat gains, and for that reason animals in prime finish are the most costly and must bring a higher price.

If you want to cut 4 or 5 pork chops to the pound, or want hams weighing 8 to 10 pounds, select a hog weighing 140 to 180 pounds. Most farmers prefer the heavier cuts, 11 to 15-pound loins and 15 to 22-pound hams secured from 220-300 pound hogs. The heavy fat hogs yield more lard in proportion to lean than the lighter hogs, and that may affect your choice. Barrows and gilts under 10 months of age produce the highest quality pork. Young sows that have had one or two litters of pigs make acceptable pork but it is coarser in texture. Young boars under 2 years of age make only fair pork and they must be castrated and then fed for another month or two to get rid of the sex odor. It is usually best to sell aged boars and sows to a packer who is equipped to handle that type product. There is no particular objection to butchering an animal that is in heat if it is properly bled and chilled.

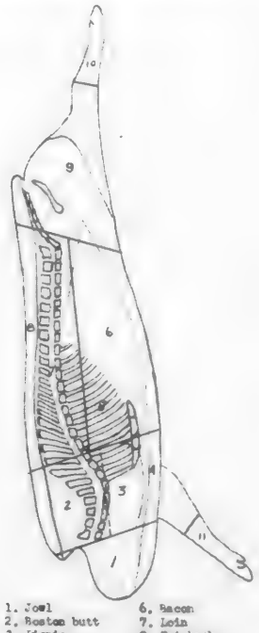
Slaughtering Equipment

Very little equipment is necessary for the seasonal slaughter of hogs for home consumption. The necessary items are listed below under one heading, and the items that may later be added for the sake of convenience under another:

Necessary Items: (1) A 52-58 gallon barrel or a scalding trough 20" high, 30" wide, and 6′ long; (2) A sturdy table 2′ high, 3′ wide, and 6′ long on which to scrape the hog; (3) Hog gambrels (metal preferred); (4) A sticking knife (6 or 7-

A BARREL OR DRUM large enough to admit the hog and the hot water, tilted near the hoist and scraping table, starts the butchering job. Water should be at 150-155° F. If too hot, the hair will set. Scald the front end first, add borax or ashes to loosen scurf.

Primal Cuts of Carcass



inch blade); (5) Several 6-inch skinning knives (8 or 10-inch butcher knives will do); (6) Hog hooks (8¾" x ⅜"); (7) 24-inch meat saw; (8) Some type of hoist (a tripod, windlass, or self-locking, 3 pulley, double block rope hoist, 1000 lbs. capacity; (9) A 12 or 14-inch steel; (10) A clean vinegar or molasses barrel for pickle curing (not necessary if meat is to be dry cured); (11) A lard press (14-inch cylinder, weight 150 lbs., or hand press and stuffer, 8 quart size); (12) Hog scrapers (the bell and loop style preferred); (13) A meat chopper (hand power, capacity 4 lbs. per minute, weight 16 lbs.); (14) Lard pails or crocks; (15) Scrapple pans; (16) Scale (at least 60 lbs. capacity).

Convenient, But Not Necessary: (17) Cleaver (8" blade, weight 2¾-3 lbs.); (18) Hot water thermometer; (19) Salometer to test the strength of the curing pickle; (20) Several boning knives (6-inch blade); (21) Electric or power-driven meat chopper; (22) Stove and kettle (30 gallon capacity, weight 350 lbs.); (23) "Brine Gun" for pumping the pickle into hams; (24) Portable platform scale; (25) A building in which to make a small slaughter room; (26) A smokehouse (6′ x 6′ x 8′, built of concrete blocks).

Procedure in Slaughtering

The usual practice is to drive or haul the hog to the place of slaughter and then shoot it between but slightly above the eyes to stun it. Shooting a hog is considered part of the sport of hog butchering but, as Lum and Abner would say, "I'm agin' it." If the aim is bad and the bullet plows into the shoulder or some other part of the hog, a great deal of damaged pork is the penalty.

The use of a high-powered rifle kills the hog outright and that is the very thing that prevents a free bleed. When the heart action is stopped, the blood must drain out by gravity instead of being pumped out. The hog usually lies on the ground, in a position that is not conducive to gravity drainage. We have come to realize that a great deal of our pork spoilage starts with improper bleeding.

Nowadays most farmers possess a hurdle or two for handling their sheep or hogs. These hurdles can be made into a holding pen and moved into position be-

neath a hoist. A chain or rope shackle can then be placed around the left rear leg below the hock in order to raise the hog several feet off the ground. There is no cause to be squeamish about bleeding a live hog because the sudden loss of blood produces shock and the hog passes into a coma in 30 to 40 seconds. It may kick occasionally for 2 to 5 minutes but that is normal muscular reaction under a labored heart beat and receding nerve control.

With the flat of the left hand on the shoulder (do not grasp a leg) to steady the hog, place the point of the sticking knife several inches below the point of the breast. Give a quick upward thrust and direct the point of the knife toward the tail (this is very important), taking care to keep it midway between the shoulders to avoid sticking into the shoulder. A dry stick (no blood) is the result of the knife being directed toward the top of the shoulder instead of toward the tail, thereby failing to sever the jugular vein or the carotid arteries. A hog that has been stunned or shot is held on its back by one man who straddles it and holds both front feet while the operator makes the stick as described.

Scalding and Scraping

The scalding barrel and scraping table should be placed near the hoist. The barrel should tilt against one end of the table at a 45° angle and be filled half full of water heated to 150-155° F. A handful of borax soap powder or a shovelful of wood ashes will soften the water and aid in loosening the scurf. Since hot water presents a problem on many farms it may be necessary to use a given amount of water sparingly and at a much higher temperature in order to make it go as far as possible. The hotter the water, however, the quicker the hog will scald and it will be necessary to withdraw it as soon as the hair pulls away easily. Over-scalding causes the skin to contract around the base of the bristles, holding them tight. This is termed "setting the hair." Once the hair is set, the only way to remove it is to shave it off. Scald the front end first, because the hind legs are dry and make handling easy, then insert a hog hook between the lower jaw bones and scald the rear end.

Use plenty of elbow grease on the scrapers if you want a clean white hog. Clean and shave the head and feet while the hog is on the scraping table. This is also the time to remove the tongue. Make one incision from the stick down the center of the lower jaw and then cut close to either side of the inside of the jaw bones to the roof of the mouth. By inserting the finger under the tongue, the latter can be pulled out and cut off in front of the bony larynx or Adam's apple. Loosen the tendons on the rear legs as shown in Fig. 2; insert the hog gambrel, and raise the carcass.

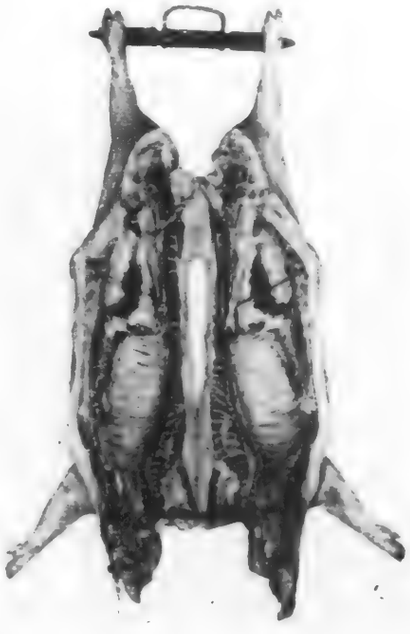
Scalding hogs in a trough is made sim-

USE FORCE rather than a knife to remove stomach and intestines. Catch in tub.

SLIT THE SKIN AND BACKFAT, saw or chop down middle of backbone to shoulder fat.

BEST BUTCHERING WEATHER is below 40° F. Above that chilling must be done artificially. Carcass will not cut easily unless well chilled. Best method is to dress in afternoon, chill out in temperature of 35° to 38° F. overnight, cut up the next morning.

Fig. 6—Packer Finished



ple by placing a chain or rope under the hog and turning it from side to side by keeping the rope taut as you pull to the right and then to the left. A hog throw-out can be made out of rod iron in the local blacksmith shop and attached to a wooden or metal scalding trough. (Fig. 3).

Eviscerating

The suspended carcass must be washed and any remaining bristles shaved off. Bristles are popular in brushes but not in sausage or pig souse. Note that we use a more refined word for "gutting." As one youngster remarked. "Won't that be harder to do?"

Whatever you call it—make an incision starting midway between the two hams, following the white tissue that separates them. This tissue leads to the fusion point of the pelvis which can be split with a knife (Fig. 4). Make a cut about one-half inch deep down the center of the belly to the cut made in the throat. Cut out the pizzle cord on males and expose the intestines directly below the hams. Guard the point of the knife when opening the belly. Loosen the bung and anus by cutting on either side and back of it, keeping close to the backbone. Tie a string around the anus to keep the contents from running out of the large intestines.

Use force rather than a knife in removing the intestines. Place a tub under the hog and use both hands to pull out the stomach and intestines, which are dropped into the tub. It is very difficult to clean the small intestines for sausage casings if they are allowed to drop in dirt or grit. Free the liver from the intestinal tract and remove the gall bladder by forcing the index finger under the bile duct above the bile sac and pulling off the duct and bladder.

Split the breast with a knife, cleaver, axe, or saw and remove the pluck (heart, lungs, gullet, and windpipe) from the chest cavity by cutting out the diaphragm (white) where it joins the diaphragm muscle or skirt. The muscle that hangs down (hanging tenderloin) from the backbone is left in the carcass. Cut across the large artery along the backbone and pull the pluck down through the split breast until it is free. Remove the heart from the pluck and flush it with water to remove the blood. The carcass at this point is known at a shipper style dressed hog.

How to Dress the Hog Packer Style

Split the carcass through the center of the backbone and head with a saw or sharp axe. If wooden gambrel sticks are used, it will be necessary to leave the back fat attached at the shoulder to prevent the carcass from slipping off the gambrel.

To remove the face, cut back of the ear, following the crease of the jowl, and lift it from the side of the jaw (Fig. 5). The face is disjointed at the atlas joint next to the head. The two sides of the face are most easily handled in this way than if the head were left whole.

Loosen the leaf fat, something that is seldom done in home butchering, by forcing the thumb under the fat at the point of the breast bone and the skirt. Grasp the fat with both hands and pull up on it to free it from the sides of the belly. Let it remain attached at the base of the ham. Wash the carcass free from blood, particularly in the region of the neck. The finished carcass is illustrated in Fig. 6.

Chilling the Carcass

If the temperature is above 40° F., the carcass should be iced or removed to a refrigerator. Care should be taken to avoid having a carcass freeze during zero weather because it must then be thawed before it can be cut. Once thawed, the meat loses some of its flavor and keeping quality. Most farm pork is slaughtered in the early hours of the morning and cut during the afternoon or evening of the same day. Such a short chill period is not particularly objectionable providing the cuts are kept under continuous chill to bring the inside temperature down to

35°-38° F. It is rather difficult to do a neat job of cutting on a soft, half-warm carcass. For this reason it is recommended that butchering take place in the afternoon and the sides of pork left to hang in a cold place (30°-38° F.) overnight to be worked up the next day.

Estimating Live Weight

In case you should want to know the live weight of the animal slaughtered, it can be approximated from the carcass weight by dividing the weight of a pork carcass under 180 pounds by 75 and multiplying the result by 100. Hog carcasses weighing over 180 pounds should be divided by 80 and the result multiplied by 100. The figures 75 and 80 represent the average dressing percent of hogs under and over 250 pounds live weight.

Processing the Hog Carcass

Cutting—By following Figure 7 closely you will be able to tie in the following brief description of how to cut the carcass. If, however, you are not quite clear about some points on cutting up a hog after reading this butchering description it is recommended that you obtain a bulletin on the subject from your State Experiment Station, or order the well-illustrated book dealing with all phases of slaughtering, cutting, curing, freezing, and preparing pork, beef, lamb, and veal, entitled "THE MEAT WE EAT", published by the Interstate Publishing Company, Danville, Ill.

Jowl—Use a steak knife in making the primal cuts. Place the knife close to the front of the shoulder in the crease of the jowl and cut close to the end of the neck bone (atlas joint). After separating the jowl from the shoulder, flatten it with a cleaver and trim the ends to make it square. It can be cured in the same way that you cure the bacon, in which case it is known as "jowl bacon," or it can be used fresh, ground with pork trimmings for sausage, or cooked with the head for making head cheese.

Shoulder—Place the saw on the backbone midway between the third and fourth ribs (Fig. 8) and saw through the backbone and blade bone and sever the shoulder with a knife. Remove the three ribs and neck bone from the inside of the shoulder and cut off the foot at the knee, or several inches above the knee if you want more of the foot for making pickled pigs' feet and pig's foot souse. Trim off the breast flap. Turn the shoulder and remove the skin and fat from two-thirds of the outside area of the shoulder, leaving a collar of skin on the picnic end of the shoulder. To separate the shoulder into a Cala or Picnic and a shoulder butt or Boston butt, make the cut at the lower edge of the blade bone across the shoulder. The picnic shoulder can be cured and smoked or used for sausage and scrapple meat. The shoulder butt can be used as a fresh pork roast or the blade bone can be taken off and the boneless butt cured and smoked. This cut appears on the market

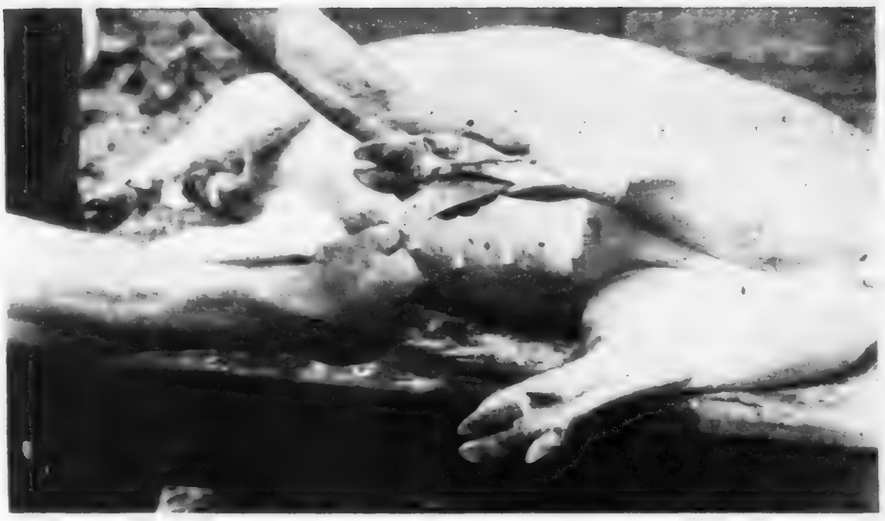


FIG. 2. Slit the skin on the rear legs between the upper toes, cut around and loosen the tendons, and insert the gambrel. These are the strongest tendons in the carcass

FIG. 11. On ham end of loin and an inch below, cut parallel to backbone to the last rib. Saw across ribs from shoulder end and sever loin from belly with knife.

FIG. 10. Unless a "regular" ham is desired, remove skin and fat leaving one-third skin collar on hock end of ham. A ¼- to ¾-inch fat covering should remain.

TO CUT jugular vein, insert knife several inches below point of breast give quick thrust toward tail between shoulders.

FIG. 4. White tissue separating hams leads to fusion point of pelvis which can be separated by a sharp knife.

wrapped in cellophane under the name of "cottage roll." It is excellent for slicing and frying in the same manner as ham, or it may be sliced thin to take the place of Canadian bacon.

Ham—Remove the foot at the hock. Place the knife one inch back of the curve in the backbone at the same angle as the knife was when cutting off the foot and sever the bacon from the flank. Saw through the bone and complete the removal of the ham from the loin with a knife (Fig. 9). Remove the flank from the ham and also the tail bone. The fat should be trimmed from the cushion of the ham (inside or aitch bone side) to expose the center cut so it will take the cure more rapidly. (Salt penetrates fat very slowly). You now have a ham cut "regular." Unless you desire a great deal of fat on your ham steak, I recommend that it be "skinned." To do this, turn the ham and remove the skin and fat (leave a ¼- to ⅜-inch fat covering) from two-thirds of the outside area of the ham as was done in the case of the shoulder, leaving a collar of skin on the hock end (Fig. 10).

Loin—With a sharp knife, make a cut one inch below the tenderloin muscle on the ham end of the loin, cutting parallel to the backbone up to the last rib. Place the blade of a meat saw close to the backbone on the blade or shoulder end of the loin and saw across the ribs to the cut made on the ham end. Then sever the loin from the belly with the knife. (Fig. 11).

Place the loin on its backbone and remove the back fat (Fig. 12). The back fat can be dry salted (salt pork) and used to cook with greens or baked beans, but it is generally rendered into lard. The loin can be cut into roasts or chops or boned and fried down.

Canadian Bacon—The sirloin muscle (large muscle) from large loins, when stripped out and cured for several weeks in a 60° pickle and then smoked, is called Canadian Bacon.

Bacon—Remove the spare rib by cutting close to the ribs (Fig. 13). You may like plenty of meat on the spare ribs but remember that it will be at the expense of bacon. Trim the edges and square the ends. It is well to cut a strip from the nipple edge wide enough to remove them.

Making the Pork Sausage—A tasty, juicy pork sausage is one that contains about 20 to 30 per cent fat. Use the trimmings and as much shoulder meat as you desire, grinding the meat through a ⅜-inch plate. If the meat is quite fatty, a limited amount of lean beef or veal (10 to 20 per cent) can be mixed with the pork. There is nothing to compare, however, with an all pork sausage.

Weigh the freshly ground pork, and for each 100 pounds, add 30 ounces of salt, 6 ounces of pepper, and 1 to 2 ounces of sage. The mixing is done by hand but if you desire a more finely ground and more evenly mixed sausage, regrind the seasoned sausage through the ⅛-inch knife. The small intestines of the hog, when cleaned and scraped, are used for casings and, when stuffed, make sausage easier to handle.

Never place seasoned sausage in the freezer locker for a longer period than one month because salt causes the pork fat to become rancid. Freshly ground pork may be frozen and held at zero for four to five months and then thawed, seasoned, and used. Many follow the practice of frying the loose or stuffed sausage until brown and then placing it in crocks and covering it with hot lard.

Rendering the Lard

The skin should be removed from the fat because rinded fat produces a higher quality lard of greater stability. Cut the fat into small pieces of similar size to get a quick, uniform rendering. If the rendering is done over an open fire, the stirring should be frequent and the fire should not get hot enough to scorch the lard. Do not use a copper or brass kettle. When the cracklings float and become chestnut brown in color, and no more vapor rises from the kettle, the rendering can be discontinued and the lard strained through several thicknesses of cheese cloth into clean lard pails or crocks. The cracklings are pressed and the cake used for chicken or hog feed.

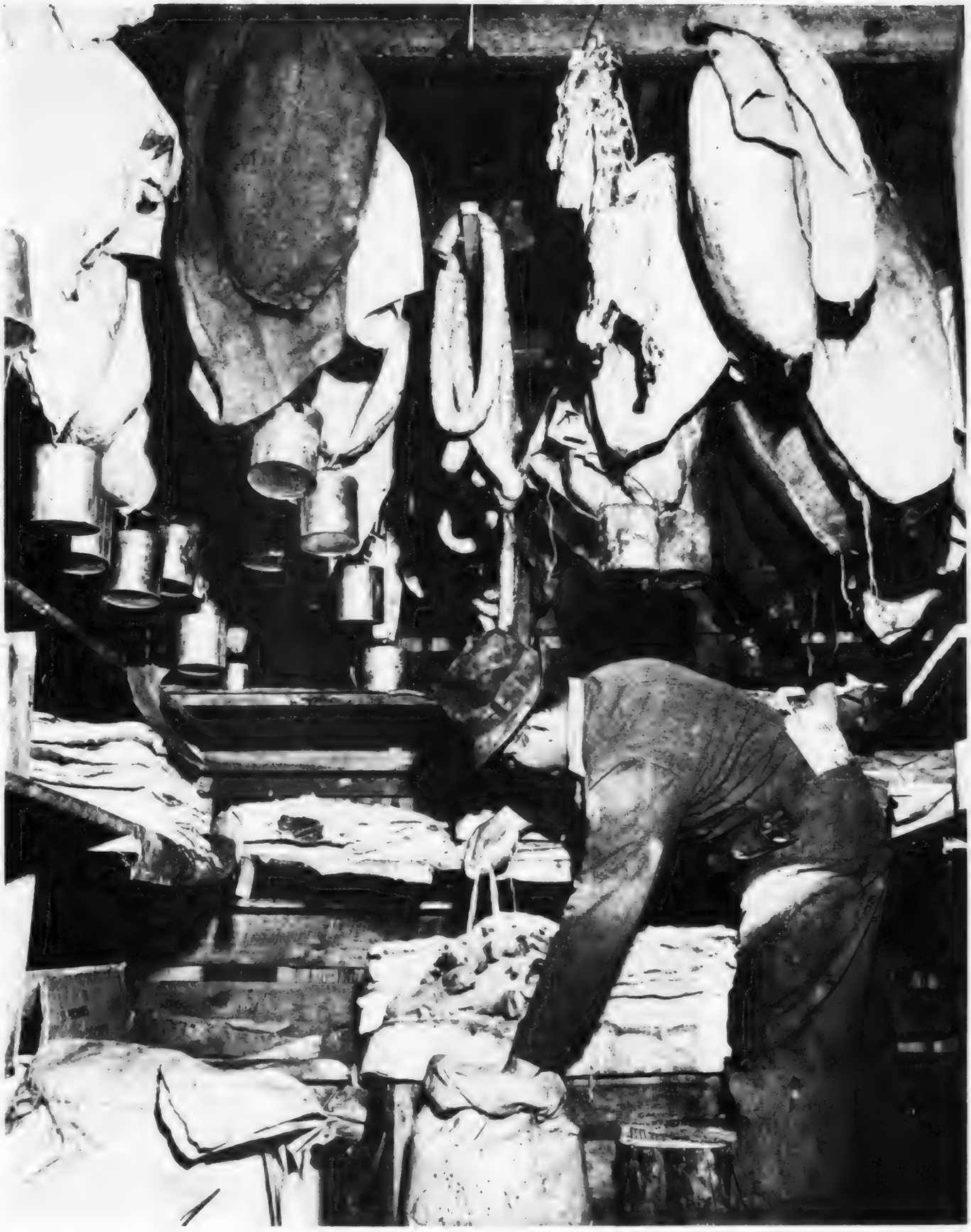
Home rendered lard will be grainy unless it is stirred after it has cooled to the cream stage. If the lard is dark in color it is because it was scorched or there was too much lean meat left on the fat. Lard should be chilled rapidly and then sealed from the air to keep it from becoming rancid. The surest way to keep lard sweet is to place it in sterilized glass jars (quart or two-quart sizes) and seal the lid to exclude the air. Wrap the jars in paper or set them in a dark, cool place. Lard in 50-pound pails should have a layer of cellophane placed directly on top of the lard to exclude the air. If you have available refrigeration space, store the lard there, by all means.

Curing the Hams, Shoulders and Bacon

There are various curing formulas but they do not differ in the ingredients used but in the amounts to use. The formula recommended is one that is widely used and is the product of considerable experimental work. It consists of 8 pounds of salt (table or flake), 3 pounds of sugar, and 3 ounces of saltpeter. Salt does the curing, sugar brings out the flavor and aids in giving the meat color, and saltpeter (KNO_3) gives the meat color and acts as a preservative.

Two methods of curing pork are in common use. The brine or "sweet pickle cure" is the most popular although the "dry sugar cure" is the safest for farm use, particularly in the South.

(Continued on page 124)



THE HAMS, the bacon, the sausage and the spareribs are to grace the skillet and the pot; the suspended cans are to catch the drip from the cured meat as it dehydrates from the action of salt. The stockingettes should be open mesh, fine enough to keep out flies, but not dense enough to encourage mold or dampness. Whether wet or dry cure, salt is an important ingredient of all cures. Formulas are important, but that final, heavenly flavor comes more often from the "know how" gained from long experience.

LEAN AND EFFICIENT

BY L. M. WINTERS

MINNESOTA PORK PROFESSORS PRODUCE A NEW BREED OF HOG

On too many American farms there are just two types of hogs—lean hogs and fat hogs. If a farmer has lean hogs he wants to fatten them as soon as possible in order to market them. Beyond that, "pigs is pigs." Progressive farmers know there are more profits in well-bred hogs than in scrubs and they are always on the alert for improved breeds.

There hasn't been any important new development in the hog breeding industry for a long time. Old standard breeds have been improved but nothing new has come along until the recent announcement that the Minnesota College of Agriculture has succeeded in establishing a new line of porkers which some hog men thing have enough of a bulge over familiar breeds to warrant a lot of excitement among hog men.

The new breed, known as Minnesota No. 1, is interesting because it has the ability, under good conditions, to turn out 100 pounds of weight for every 325 pounds of feed. This is considerably better than the average hog which adds on 100 pounds of weight for about 425 pounds of feed. Another point in favor of the new breed is that it finished out earlier, taking about 135 days to reach 200 pounds. It is regarded as rather more prolific than the average—another good point.

While the leaner bacon and better cutting qualities of Minnesota No. 1 may not be important factors now, it is expected to be later when the housewife ceases to be grateful for anything called "pork" and gets back to prewar habits of asking for choice cuts and leaner bacon.

The public buys a good deal of bacon but it would use much more if it could buy regularly a bacon well streaked with lean. The housewife doesn't buy bacon to get lard. Nor does she buy ham to get lard in place of lean meat. She takes enough fat on both the bacon and ham to make them good, but it's the lean she is after. If we are to invade the British market we shall have to make the streak of lean a good deal wider and more uniform.

Then there is our lard problem. Right now it doesn't appear to be a problem, but unless we continue to give the surplus away or unless European buying power picks up, we will again have a surplus of lard. We have improved some of our lard but much of it contains everything from the hog except the squeal. Some people like foods fried in lard but there are people that don't or at least think they don't. Unhappy results from using poor lard has caused many people to prefer vegetable fats for cooking. The competition from these fats will be stronger as soon as our oil shortages ease up. It might be a good policy now to plan on producing less lard.

In 1936 the University of Minnesota agronomists set about trying to do something about this problem. At that time they secured a Landrace boar from the U.S.D.A. and mated him to six Tamworth females. In 1937 the experiment station became a cooperator with the newly organized Regional Swine Breeding Laboratory. At the same time the entire Minnesota project was greatly enlarged.

The six Tamworth sows farrowed crossbred pigs in 1937. This crop of pigs provided the foundation for the Minnesota No. 1 strain. More Landrace and Tamworth stock was introduced in 1937. After the spring pig crop of 1938 was weaned

the entire stock of purebreds was sold From that time on the stock was bred from within. Selections from the outset were made on the basis of performance Performance was based on five factors, namely:

1. Fertility
2. Survival
3. Rate of gain
4. Economy of gain
5. Quality of the product

After the Minnesota No. 1 line was well advanced we were told we had been lucky After being told this several times we decided to find if we could repeat with a new strain based on a different cross. We crossed the Yorkshire with two of our inbred lines of Poland China. This was the foundation for the Minnesota No. 2 line. From that point on the procedure in their development was similar to what had been used with the No. 1. The No. 2 line is only in its fifth year. We do not regard it as a finished product, but it is far enough along so we feel quite certain what the line will be like when finished.

The nine year average performance on the Minnesota No. 1 line is as follows:

Pigs born alive..... 9.2
Weight at 168 days.. 211 pounds
Feed per 100 pounds gain
(Weaning to 200 lbs., 313 pounds)

The average performance of the Minnesota No. 2 line is about the same. Both lines are being developed to produce a leaner, high quality type of carcass.

The above lines differ considerably in appearance, yet they appear to possess about the same economic traits. The No. 1 is a red, long bodied, close to the ground hog. It has rather large ears and a rather long snout with very trim jowls. The No. 2 is spotted, black and white, it is not quite so long of body, and a little longer of leg. The No. 2 has a short face with a slight dish and has smaller ears that will likely end by being erect. Their temperaments also differ; the No. 1 is very quiet and the No. 2 is rather active, yet both are active grazers.

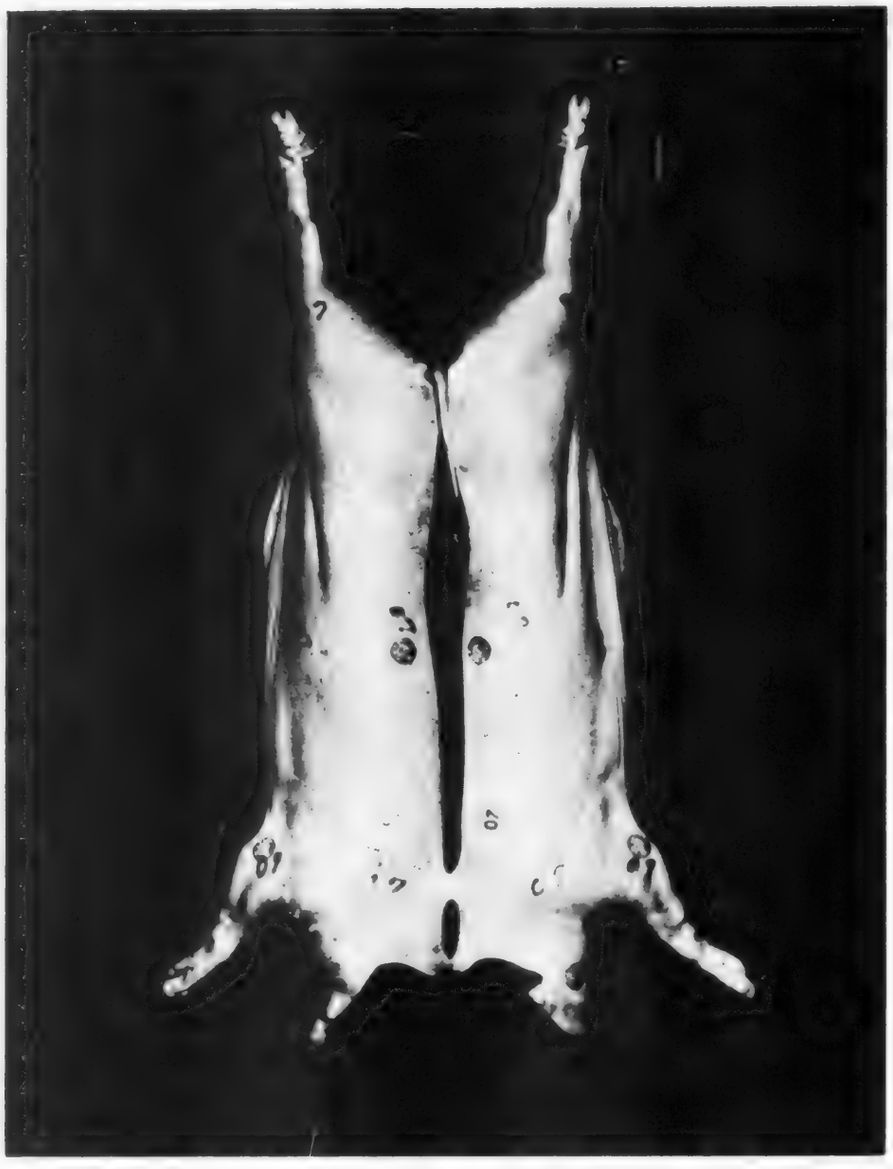
Their respective carcass qualities are much the same; both have been bred for a lean type of quality carcass. Both yield sizeable loins and bellies, the latter being well streaked with lean. The No. 2's appear to have a little better streaking and the No. 1's an advantage in uniformity of belly thickness. The No. 1's are especially good in what the packer calls the pocket the fullness of flank. The per cent of trim on both hogs if light and the yield of lard is low, provided they are slaughtered when they are ready for market, that is when they weigh about 210 pounds.

I am often asked 'But what will these hogs do for me?" Like all hogs, they perform on a reciprocity basis; what they do for you depends on what you do for them These hogs won't do much unless proper rations are provided and that means sufficient protein, vitamins, minerals and water. They won't do much that's worth

MINN. NO. 1 and Poland China inbred cross. One of the best of the crosses.

MINN. NO. 1 gilt. This gilt shows the best features of the new breed.

A CROSS of Minn. No. 1 and Minn. No. 2. Note leanness in all types.



CARCASS of Minnesota No. 1, packer dressed. The loins are full, the flanks are full, and the belly well-streaked with lean. The best slaughtering weight is 210 lbs.

while if they are full of lung or round worms. Improved breeding calls for improved feeding and management; breeding will not substitute for feed and sanitation.

Crosses Market Well

It is the crosses to which we look for the best results in the production or market hogs. The whole purpose in producing inbred lines is to have better breeding material with which to make better crosses. Once again theory and practice are making good bed fellows, because the crosses are performing very well. As is to be expected some crosses are doing better than others. The Minnesota No. 1 appears to possess a trait that corn breeders call "combining ability" for they appear to cross well with most everything. About 6000 crosses on farms have been observed and we have produced a large number of crosses under experimental conditions.

The best cross so far produced was a cross between the Minnesota No. 1 and No. 2 lines. These hogs averaged 214 pounds at 145 days. Furthermore, they yielded about everything one could ask for in a carcass; they yielded *19 per cent* loin. Again we must not expect the impossible, because every pig must have a head, feet, shoulders, etc., so all we can hope to do is to raise the percentage of the more valuable cuts. The hams were very short shanked and shapely. The bellies were uniform in thickness and exceptionally well streaked.

Many more crosses have been made between the Minnesota No. 1 and our inbred Poland China lines. The largest group was produced in 1944; they averaged 214 pounds at 154 days and made a 100 pounds of gain on 302 pounds of feed. They also produced outstanding carcasses. The No. 1 is a remarkably prepotent hog and stamps his type on about everything he is crossed with. The crosses are for the most part long bodied, close to the ground, thin skinned, smooth fleshed and light boned.

A question generally raised is "How is the farmer to utilize this hybrid vigor; must he do as in corn, start with fresh stock each year?" The consensus of opinion indicates he will use the inbred lines as we are now crossing the breeds by the "Rotation System" of crossing.* Briefly, the rotation system is that the farmer rotates in the use of boars belonging to three or four breeds. Each year he retains gilts from the year's crop to mate to the new pure bred boar of a different breed. The development and utilization of inbred lines is after all only carrying the "purebred idea" one step farther. In this case we carry the purification to a higher degree; then when we cross, we expect—and get—more increased vigor.

There are three reasons for not duplicating the methods used in the production of hybrid corn. One is that corn is much more prolific. Plant one kernel of corn and you expect to harvest an ear with about 1100 kernels. Hogs are a long ways from being that prolific. The second reason involves disease. Transferring live stock back and forth is an excellent method of spreading disease. The third reason is that females, especially swine, are somewhat sensitive to changes in homes; too often they just do not perform as well in their new home as in the old. The result is the new stock often does not perform up to standard until the breeding stock is raised on that farm. All this indicates that the rotation system of crossing is the most likely method to be used to obtain hybrid vigor.

There are many points not yet clarified regarding use of inbred lines in the rotation system. We have a right to expect, on the basis of other studies of crossing, that some lines will cross to better advantage than others, preliminary work indicates that is holding true for swine. We don't know as yet which lines will cross to best advantage. We can expect to develop a satisfactory rotation of lines in a relatively short time, but it will take years to find the *best* combinations.

We already have a rotation that appears to be quite satisfactory, but it will be surprising if it is the best combination possible. We also need to determine the relative merits of a two, three, and four-line rotation. It may be that the best boars will be produced from a cross of two lines; in corn most hybrid corn is produced by use of the crossbred male parent. In addition we should expect that the methods recently developed can be used to produce improved inbred lines which will in turn produce better crosses.

How Can I Get One

Many letters have been received by the University of Minnesota asking for breeding stock. We are making stock available as rapidly as we have a surplus, but hogs do not multiply like corn. We have reserved our entire female output for Minnesota farmers until such time as we have

*For further information see Minn. Ext. Bulletin No. 180. U. of Minn., Minneapolis, Minn.

caught up with their demands, and it looks as though that is a long way off. As female stock becomes available we sell it to farmers, generally in groups of no less than five. The farmer then becomes a cooperator with us for the propagation of the line in question. A total of 31 cooperative agreements have been entered into for propagation of the Minnesota No. 1's; 7 of the 31 for one reason or another are no longer active. Three agreements have been made for breding the No. 2's, and two for Poland China. lines. Not all of the agreements are with Minnesota farmers. We sold some No. 1 stock outside the state before our own farmers decided they wanted all of them. A few of our farmer cooperators are in a position to sell a small amount of female stock. The supply of boars is already fairly plentiful.

Unless the stock is kept on a performance basis it is bound to slip in performance, because even though these lines are purified more highly than most stock, they are not pure. There is no expectation of ever producing lines so highly purified that they will require no further culling.

Another question often raised is "If these hogs produce a superior carcass will the packer pay for that superiority and if not, why not?" That question raises an issue on which many themes might be written. These hogs do produce a superior carcass provided they are finished and marketed at the right weight. Carcasses of this quality are worth more in the trade. In the "old days" of free trading some packers were paying a small premium for hogs sired by No. 1 boars even though the supply was limited.

Where's That Pay-Off

In fairness to the packing industry it should be made clear that they can't do much to their advantage with this quality of carcass until they have sufficient volume to establish a market for a certain brand of product. To establish a superior market you must be able to maintain at least a fair supply of the product on that market. How then are we to bridge the gap until hogs of this type are available in sufficient volume to establish a definite market for this type of bacon, ham, and loin? Shall the individual farmer make this his contribution toward the common good, and for the time being, be satisfied with the economy of production? Should a farmer's cooperative step in and help bridge the gap? Should the packers absorb the loss (assuming that ceilings will be removed) by paying a premium to encourage volume and expect that some day the volume will be sufficient to establish a superior market? (If only one or two packers decided to bo this they would have no assurance that they were not merely improving the hogs for all the other packers.) Or should the government do as the Canadian government has done, subsidize a certain quality of product? Those are the questions for which the producers, the packers and the public must provide the answers.

Some Applaud, Some Doubt

Farmers are a canny lot and are understandingly skeptical about the rosy claims made for the new hog. Tryouts under ordinary farm conditions have been only partly successful. On the success side stands T. A. Davies, a Worthing, S. D. grower. He says, "They are doing well. I may be a little enthusiastic about this breed of hog for a man of 76, but the way it looks to me; when this war is over and our vegetable oils come in, hogs will toboggan and lard will again sell for less than the live weight of hogs. If these cross-breeds produce a good quality of bacon, it seems to me than any community growing these bacon hogs in large numbers should be able to interest some packer in the project and receive the price which he deserves for his product. The English "epicure" is not the only one that likes good bacon. The time is coming and at no too distant date when hogs will be bought on their merit not on their weight just as cattle and sheep are now. Your tests with these hogs should convince anyone that there is merit in them. More meat and better meat at less cost in less time means something. I do not know as you have any bred gilts to sell outside of your state but in case you have I would like to buy two or three of them to start a pure-bred herd. If these Minn. No. 1 hogs cross well with other hogs there will be a demand for Minn. No. 1 boars and they

(Continued on page 141)

THE NEW MINNESOTA hogs are not the first lean hogs. The southern razorback is lean and lanky too, but he's lean because he's hungry and works off his fat looking for food.

This is the title page of a volume of "Berichte der Chemischer Gesellschaft," (Reports of the German Chemical Society) for the year 1874. In this volume, with thousands of other formulas, Othmar Zeidler's basic DDT formulas slept for almost seventy years, unnoticed and unknown. He called the compound dimonochlorphenyltrichlorethane. Forty-five different forms of DDT are theoretically possible. Most effective are composed largely of the isomer known technically as 1,1,1-trichloro-2,2,-bis (p-chloro phenylethane. The proportion of the various isomers influences the effectiveness. Not all DDT products are effective just because they are DDT.

D. D. T.

DICHLORO-DIPHENYL-TRICHLOROETHANE

ITS ORIGIN AND USES

A COW covered with flies isn't happy and she won't produce her maximum of milk. In your dairy if you can reduce the fly population so that it equals the cows you should expect contented cows during the fly season.

To reduce the fly population of a dairy-barn to one fly per cow or less seems like splitting flies, but DDT will do it. DDT has had a good press. In fact, its press has been too good. So extravagant have been some of the claims made for it that it is little wonder that some people believe it will rid the barn and fields of all insect pests.

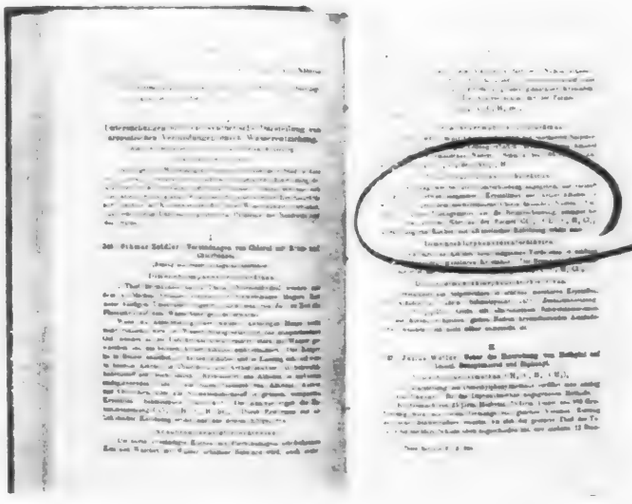
DDT is a war baby that was mustered in when still in diapers and the youngster did a noble and efficient job while in uniform. Once discharged from the army it soon went to work on the home front and is doing a good job there, but it doesn't perform miracles. New angles of its effectiveness and the methods of using it are still being developed. One of the pleasing new developments is its use as a fly pest control in dairy barns.

The Geigy Company of New York, a division of the Swiss dyestuff house which originated the DDT insecticides, has just announced the results of its experiments in fly control. The job was done with a preparation called "Neocid".

Tests on cow barns were carried out on the Walker Gordon Certified Milk Farm at Plainsboro, N. J., under the direction of Mr. Henry Jeffers, president of the Walker Gordon Laboratory and Dr. John Matthyssee, Geigy entomologist.

The extensiveness of the Walker Gordon plant with its herd of 1500 cows and 33 barns made it ideal for research. The report on the tests called the results "phenominal." Twenty-one sprayed barns became relatively fly free at once.

Below is a translation of Othmar Zeidler's report on a routine experiment he made 72 years ago in connection with a thesis he was preparing at the University of Strasbourg. The formula is the basic DDT formula but Zeidler regarded it merely as a casual test tube evolution of no particular significance.



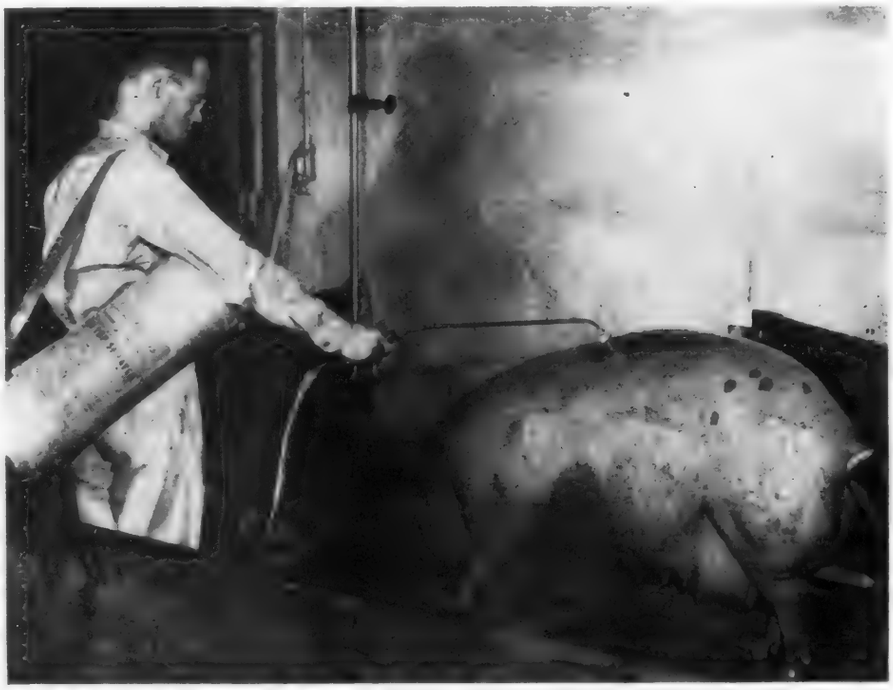
DIMONOCHLORPHENYLTRICHLORETHANE

Preparation: As indicated above for the Bromine compound. Reaction goes slow. Crystalizes out of ether alcohol and white felt-like needles similar to quinine sulfite.

Properties of compound against solvents similar to Bromine compound. Melts at 105°. Analysis indicates a formula $CCL_3 . CH . (C_6 H_4 CL)_2$.

A FIVE PER CENT SOLUTION of DDT sprayed on window and door screens will kill flies landing there for two weeks. Sprayed on walls and ceilings it will be effective up to eight weeks. Aerosol bombs, which release a mistlike suspension can also be used for flies as well as for mosquitoes. Aerosol mist will not harm furniture or walls. DDT is not a substitute for barn or house sanitation and it does not eliminate the necessity for screens and other fly and pest controls

A WATER-SOLUBLE FORM of DDT is used as a fly spray for stock. Avoid kerosene or other oil suspensions because the skin will absorb the DDT in this form.



STOCK are happier and disease hazards are eliminated if their bodies and quarters are fly-free. A 5 per cent water solution can be sprayed effectively on both.

Three weeks later, the flies came back 30% strong in the barn, but on the cows themselves which had been sprayed, there was less than a fly per cow.

Meanwhile, in the unsprayed barns, the investigators judiciously counted the flies per cow, and came up with a figure 10 flies on each one. This particular figure gives the skeptic a rostrum to mount because it shows the Walker Gordon dairy was mighty sanitary to begin with.

The scientists who conducted this experiment with "Neocid" were sincere in attempting to locate a barn that had controlled conditions, screens on the windows, tight fitting doors, electrically driven water hoses to clean up the milking parlor after each milking.

The effect of the spraying "Neocid" was ineffective after 85 days. The question is, what percentage of flies would be killed by DDT in a "wide open barn"; that is, one without screens, and well fitted doors, but where feasting ground and ready made fly hatcheries abound in almost every nook and corner? Probably DDT would kill off 90% of them in short order. Then the $64 question: how many flies could come to visit safely in that barn one week later? The scientists don't answer that one, for the very good reason that when testing conditions are so variable no accurate deduction can be made. However, all flies coming in from outside the barn would succumb if they happened to sit down on a cow or wall that had been sprayed with DDT.

From July 31 to August 2 the whole Walker-Gordon farm and six outlying unit farms were sprayed, using a Neocid composition (4 lbs. DDT per 100 gallons). The result was an immediate drop in fly population. The barn buildings averaged 104 flies on 10 cows on July 26 before spraying. On August 3 from 1 to 3 days after spraying, there were only 2 flies per 10 cows average throughout the barns, a reduction of 98%. The fly population never built back up anywhere near the July 26 population that season. Without spraying, the population normally increases rapidly during the summer reaching a peak in September, then dropping after frost. On September 19, forty-one days after spraying, the population averaged 39 flies on 10 cows. On October 3, after a frost, the population was reduced to 5 flies on 10 cows, and thereafter decreased to zero by the onset of winter.

The rapidity of the spraying operation is quite apparent from the fact that 31 barns and 1,550 cows were sprayed in six hours. Approximately 1,500 gallons of spray solution were applied. An orchard sprayer with a 400 gallon tank and two leads of hose was utilized.

The Walker Gordon milk plant was completely sprayed May 2 with a Neocid preparation at the rate of two pounds per hundred gallons of water. On June 19, 48 days after spraying, a few flies were present up to a maximum of 11 in one room and a total of 81 in 11 areas of the rolactor building. The second spray was applied on August 3 consisting of four pounds of DDT per one hundred gallons of water. This spray again reduced the flies to an almost zero population.

One of the outlying farms presented a good example of DDT efficiency. This farm was untreated and flies built up to high populations that were extremely annoying. On June 5 counts showed 160 flies on 5 windows, 100 on a manure car track, 144 on 8 posts. The barns were sprayed August 2 and the population reduced almost to zero. On September 19, 48 days after spraying the population has still not built up to any significant number. The same 8 posts had only 15 flies resting on them, and the windows only 9 flies, a reduction of 90 to 94%.

Fly control contributed to the general sanitation picture. Flies are known carriers of bacteria and other micro-organisms and a reduction in fly population serves to reduce their spread.

During the DDT experiment on the

Walker-Gordon farm there was not a single case of "pink eye" (a fly borne disease of cattle) in the milking herd all summer. During past seasons there have been numerous cases of "pink eye" with milk production of affected cows being reduced.

As a result of the work at the Walker-Gordon farm, the following conclusions were reached and these recommendations are being made to dairy men by Geigy.

1. DDT is not a substitute for farm sanitation. Continue manure disposal practices.
2. Use Neocid BA 50 (wettable powder) at the rate of 8 to 10 pounds per 100 gallons of water.
3. Make application to walls, ceilings, posts, etc. at the rate of 1 gallon for every 200-250 sq. ft. of surface.
4. Use a power sprayer such as an orchard sprayer or power whitewashing unit. A three or four nozzle broom type gun with No. 3 discs is preferable.
5. In the latitude of New Jersey and Pennsylvania and North, make the first application when the flies just appear, usually in May, and the second application between July 15 and August 1. For areas south of this latitude, spray a little earlier.

How can you apply the results of this test to your own farm, and know in advance the percentage of flies that DDT will kill and how long will this preventative effect last? The only way to know is by personal experimentation in your own dairy barn. DDT is no substitute of sanitation. It is merely another form of practicing it. The results of "Neocid" under controlled conditions are so very good that it seems worth the while of every farmer to try DDT spray in his own dairy barn and see if his own sanitation is tight enough on other points to permit DDT to lock the last remaining gate.

As a pasture spray for cattle, beef and dairy, DDT is also effective. It is practical to trade a very few ounces of DDT for several pounds of beef or butterfat. Fly season has always limited the gains beef animals make on pasture. Cattle treated with DDT can forage in comfort, eat their fill, chew their cuds in peace, without need for the everlasting swinging tail.

Around The House

In the farm house a suspension can be used, but a solution containing 5% DDT is usually applied to kitchen ceilings and other favored spots where flies gather. A well screened home can be kept practically fly free. Federal entomologists recommend interior spraying with a 2.5-5.0 per cent suspension or solution with a fairly coarse or "wet" spray to leave a residue. Indoors and in shade such a spray will continue killing flies for weeks. One of two sprays will cover the season. The residue will kill flies that enter. If sprayed on a sunny outside wall, the residue will last only two weeks.

One of the best forms of fly—and mosquito—protection is to wipe screens with a rag or sponge saturated with a 5 per cent DDT-oil solution. This will kill either flies or mosquitos inside or out. At many a farm home there is an area where flies swarm, ready to dart in when a screen door is opened. A good residual spray or oil solution on the spot will kill the flies that come to rest, so they will never enter.

Spraying mattresses with 5% kerosene solution of DDT puts an end to trouble from bedbugs that may come to the farm

A HOME-MADE portable sprayer for use on garden crops. DDT has little or no effect on the Mexican Bean Beetle, Cotton Leaf Worm, Red Mites, Sugar Cane Bores, or the Boll Weevil. Its first job as an insecticide was on the Colorado Potato Beetle in Switzerland.

DDT RELEASED from airplanes is effective against certain forest tree pests and is the best method of mosquito and fly control over large areas

THE DREADED Japanese Beetle, the Elm Leaf Beetle and other fruit tree pests are liquidated by DDT, but sunshine and wind break it down in a few days.

home with transient workers. A treatment will last for at least a year. DDT is also the best eradicator of bedbugs in poultry houses. For several other household insects—fleas, clothes moths, roaches and ants—DDT is very effective.

On Forest Pests

A use likely to prove important is protection of shade trees and forests and woodlands from such pests as the spruce budworm, gypsy moth, Japanese beetle, and other insects that DDT kills effectively. On the basis of cost per acre and from the angle of ease and economy of applying it from an airplane or a hovering helicopter, DDT is strictly the first insecticide to show real promise as a practical protection for timber. Last season's experience with strong solutions of DDT blown into a fine mist over forest land made clear that a single flight to control spruce budworm could cover hundreds of acres. A single loading with concentrate was as effective as with weaker sprays that would call for many flights. For this particular job it did not make much difference whether the toxicant was released as 1000 gallons of 0.3% spray, or 100 gallons of 3%, or 10 gallons of 30%, provided each was divided into the most effective size of drop or particle of mist. The cost of airplane distribution of the 10 gallon load is, of course, merely a fraction of what it would cost to distribute 1000 gallons over the same area. But this particular feature does not apply to many other pests. For them, the kind and quantity of dose must be according to the best working rule dictated by experience.

In bright sunlight, when DDT is used in an orchard or on a garden crop, the chemical breaks down within a comparatively short time and ceases to poison. This means that for a long-season pest such as the codling moth there will have to be repeated sprayings. For one like the vetch bruchid, however, one spraying to cover the few days when the seed pods are forming is enough, and sunlight soon decomposes the DDT and prevents poisoning of beneficial insects.

Simple arithmetic is what is going to decide many of the DDT questions. For example, if the owner of a beef herd can spray his animals at a cost of about 15 cents a head, and if the sprayed animals average a gain of half a pound a day more than unsprayed animals—as has been reported in some tests—it figures out that if a spraying is effective for only two weeks, the owner is buying beef at around 7 pounds for 15 cents, a good buy for sure.

Sheepmen will be interested in use of DDT 5% powder that has proved effective in the treatment of maggot infection. The herdsman at Fensternol Farms near Amelia, Ohio, used the powder on all infected wool areas that resulted from docking drainage. By morning the maggots were 100% killed. Ewes and lambs had washed the area during the night but

there were no harmful results.

It has been indicated by field tests conducted by the U. S. Department of Agriculture and collaborating entomologists that DDT compositions, Gesarol Sprays and Dusts, are successful against such garden pests as the Japanese beetle, thrips, tomato fruit worm, potato beetles and the three important cabbage worms. In attacking the Oriental fruit moth, peach damage has been reduced from 60 to 90% compared to unsprayed trees. Gesarol sprays and dusts control the white apple leafhopper, give excellent promise against the apple maggot and have shown splendid results against the codling moth, Enemy No. 1 of the apple orchard.

Gesarol DDT compositions completely protect potatoes from damage by potato beetles and take care of the potato leafhopper, the tarnished plant bug and contributes to control of aphids. Insects attacking peas, celery and other crops have been controlled.

Some of the most spectacular results thus far obtained have been against the European Corn Borer. The inestimable value of control in the fight on corn pests is obvious. Incalculable, too, is the prospective boon to the citrus industry, in which results against the red scale have been highly promising.

Like the botanical products, pyrethrum, rotenone, and nicotine, commonly used as insecticides, DDT compositions are poisonous on contact to common insects, paralyzing an insect's nervous system and giving it what has been alliteratively called the "Gesarol Jitters."

These natural products, pyrethrum, rotonone and nicotine, however, lose their strength in a short time after application to the plant or other exposed surfaces.

Lead arsenate, Paris Green and other inorganic stomach poisons hold their effectiveness indefinitely. The insect must eat the poison if it is to be killed. But certain insects, like plant lice, do their feeding by sucking the sap within the plants and so do not swallow the dust or the spray residue left on the outside of the plants. For these there must be an insecticide that will kill on contact.

To insects Gesarol is both a stomach and contact poison, a unique characteristic, indeed. So far as entomologists are concerned, this is a sensational circumstance. Claims by Geigy, Switzerland, of this double quality, seemed fantastic and were received with some skepticism by American scientists. Their reluctance may be appreciated when it is stated that of 3,000 synthetic organic insecticides tested by the U. S. Department of Agriculture only two were found to possess both contact and stomach lethal qualities, sodium fluoride and DDT. Geigy, well known in the synthetic dyestuff field but relatively new in the insecticidal field had hit the scientific "jackpot." From an economic standpoint, the savings may be understood when it is known that in the same area it has been necessary heretofore to use two poisons, stomach and contact to combat the two types of pests. With few exceptions Gesarol DDT compositions take care of both.

FLEAS AND LICE flee from DDT dusted on the animal. Its main war-time use was against lice. It is a repellant and effective against chiggers and ticks.

Fumigation and egg destruction, which are other general methods of insect control, are not as convenient and direct in action as the spraying and dusting with DDT compositions. Incidentally, DDT has no ovicidal value, but the effect of it is so lasting that the young insects are killed as eggs hatch.

DDT is available in several forms: (1) purified DDT for use in aerosols; (2) dusts of various strengths and particle sizes; (3) wettable powders for suspensions; (4) emulsion concentrates; (5) oil sprays for use "as is" or to be diluted; and (6) DDT in various solvents and combinations to be used as directed for specific purposes.

The DuPont company has recently announced a line of DDT compositions for general farm use. Marketed under the family name of Deenate, various members of the family can be mixed with water, used as a dust, as an oil emulsion, or as a solution in oil. A leaflet describing its uses will be mailed on request to the Agricultural Chemicals Division, Grasselli Chemicals Department, DuPont Company, Wilmington, Delaware. There are many other compositions of DDT on the market and more are coming. All are variations of the original formula adapted to particular conditions and when marketed by reliable firms can be depended on to do the job intended of them. Deenote is similar to Neocid. Neocid is a Geigy product and is marketed by distributors under various trade names.

These products or formulations definitely are not interchangeable. A single farm may need to have on hand from two to four DDT products in various percentages of dusting and spray mixtures to do the jobs on hand. It is likely to be wasteful, dangerous, and destructive to take a chance on rule-of-thumb by-guess-and-by-gosh substitutions.

Nearly all advice on DDT in 1946 is going to seem to stutter a bit. Research men ordinarily wait—too long at times—until they are sure. The background situation with DDT has forced their hands. What they are going to be saying for one

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FALL PASTURES

BY MYRON HAZEN

Most of our cultivated grasses which from the basis of both our native and improved pastures tend to become dormant or at least make relatively little growth during July and August. The combination of high temperatures and inadequate moisture, particularly when combined with heavy early grazing, hinder midsummer growth.

This is particularly true where blue grass predominates. Blue grass is notoriously lazy during the hot summer months. While heavy applications of complete fertilizers made in the late fall or early spring may double its early carrying capacity, it becomes practically dormant from the Fourth of July until Labor Day. Livestock on late blue grass pastures tend to over-graze and seriously injure the crowns.

For this reason a variety of adapted grasses and legumes is recommended in seeding mixtures for permanent pastures. Certain of these, like smooth brome, are fairly drought resistant and produce nutritious herbage even with high temperatures and limited rainfall. For northern conditions, alfalfa is the best deep rooted plant capable of searching for moisture at low levels. It will not, however, successfully stand too heavy grazing. Sometime during the growing season the plants must be allowed to bloom and store up the necessary reserves in their root systems or they will rapidly disappear from the sward. On the better soils or where heavy fertilization is practiced, ladino clover will produce outstanding yields of high quality herbage. The smaller clovers like Louisiana white and white Dutch clover have fairly deep root systems. Under favorable conditions these clovers add materially to the value of the pasture during the summer months, when planted in combination with adapted grasses.

There is no time in the year when pasture herbage is more profitable than during the early fall. Throughout the East and many sections of the Middle-West where dairying and livestock production are important, the rainfall tends to increase during early September. This creates an ideal condition for applying plant foot to stimulate an increased growth. Many farmers find it profitable to make heavy application of a high nitrogen complete fertilizer in late August before the fall rains start.

When the fertilizer is applied all the livestock should be removed to avoid the danger of poisoning. The fertilizer should be applied only when the herbage is thoroughly dry. Drag behind the fertilizer drill a rim harrow, a light brush harrow, or pad of old burlap bags to knock the fertilizer off the herbage and bring it in direct contact with the soil. This heavy fertilizer application will break the dormancy of many of our better grasses quickly. After a good heavy rain has washed the soluble nitrogen and potash salts into the soil it is safe to turn the cattle back to the pastures. The cattle should have access to mineral feeding stations so that no acute shortage of minerals, especially salt, can occur in their diet. A salt-hungry animal will sometimes eat fertilizer.

Supplemental Seedings—In most of the northern states an increase in the legume population can be secured on good soils by broadcasting one pound per acre of ladino clover in early March. The freezing and thawing of the late spring will work this seed into the soil and greatly increase the percentage of legumes in the pasture. Ladino clover is one of the few seeds which can be successfully patch seeded under northern conditions without the expense of preparing a good seed bed. In the southern areas, Korean, or one of the improved strains of common lespedeza, offers the same advantages. The seedings start best if the fertilizer is disked in through the grain-fertilizer drill and the seed applied through the grass seeder attachment.

In preparing for the maximum fall pasture production, careful grazing management, particularly during the first season, is essential. None of the legumes can compete successfully with heavy growths of grasses. It is, therefore, necessary to graze the

(Continued on page 122)

PUMPKINS FOR PROFIT

By H. R. MOTTSHAW

OLDTIMERS used to cuss pumpkins, because the vines interferred with a quick job of corn plowing. When the tractor cultivator came in, the hired hand wouldn't get down from his seat to lay the vines out of the row, so the pumpkins had to go.

They deserve a better fate, for they are a luscious titbit for the cow and the hog, and they are rich in food value. Right about here somebody is bound to think of pumpkin pies, and if somebody doesn't keep on raising pumpkins one of the peculiar delights of the American dinner table will disappear. With pumpkin pie and whipped cream will also disappear the Jack-o-lantern, that symbol of Hallowe'en and the spooky period of American history.

Our early settlers found the Indians growing pumpkins in their corn fields, and Archeologists have reported finding the seeds in urns and other vessels unearthed in Peru, part of a civilization which was well advanced soon after the beginning of the Christian era. The Aztecs and ancient peoples of North America used the pumpkin and the squash both as food and the seeds as ornaments strung as bracelets or necklaces.

The slightly laxative nature of the seeds was known by now long-gone peoples, and they were included in the medicine man's collection of herbs and tonics.

Our early settlers grew the pumpkin in the same rows or hills in which they planted their corn. The fruits were gathered carefully and stored for the winter months, to be used as food. When molasses and maple sugar gave out in the fall, the early settlers crushed and hung pumpkin pulp to drain. From this juice a pleasant, sweet syrup was boiled down.

New England farmers have used the pumpkin for generations for stock feeding as well as for the traditional pumpkin pie. There was always the problems of the sprawling vines when the planting was made in the corn rows. Farmers felt the pumpkins were worth the trouble though, and the vines were moved in toward or parallel to the corn row. With the advent of mechanized farm machinery, most farmers have given up the growing of pumpkins as a companion crop with corn.

But pumpkins are still a profitable crop for any farmer. They can be grown in all sections of the United States and are practically free of disease. A few insects, such as the cucumber beetle, squash bug and stem borer attack them, but these pests can be controlled. Even without protection pumpkins come through with a substantial yield. Upwards of 3000 fruits, varying in weight from 5 to 18 or more pounds can be harvested per acre. Varieties, such as the King of the Mammoth, have attained the weight of 100 pounds,

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Seeds that will grow...opportunity

The seeds you see here are guar seeds (pronounced "gwahr") grown in Arizona under the direction of General Mills scientists.

Not so long ago they were simply a curiosity imported from India as an example of Indian fodder. But not any more.

For science has found that guar seeds contain a gum which has literally dozens of important uses. It enables paper makers, for example, to make a stronger, more uniform paper. It can be used in producing grease-resistant packaging films, printing inks, plastics, leather and linoleum. It will be important in the textile and rubber industries, and it will have many uses in making pharmaceuticals, foods and cosmetics.

The Institute of Paper Chemistry conducted the first experiments with guar; General Mills has carried the research forward and has introduced guar as a soil-building cash crop in the Southwest.

It is through aggressive new-product research like this that we believe our company can best serve America in the years to come. For new products will lead to new opportunity not only for our own returning servicemen but those of allied industries as well... to new markets and a more dependable income for the farmer... and to better living for all of us.

Copyright 1945, General Mills, Inc., Minneapolis, Minnesota, makers of Betty Crocker Soup, Bisquick, Gold Medal Enriched Flour, Softasilk Cake Flour, Wheaties, Kix, Cheerioats, Bakery Flours, Larro Feeds, Durum Flours, Vitamin Products, Wheat Gluten and Starches, Soy Products, Oat Products, Naval Ordnance and other Mechanical Products.

DOWN FROM THE NEW ENGLAND HILLS has come a legend of a tough and resourceful race of men who conquered an unhospitable and unsympathetic land, and then, with sharpened wits and an uncanny sense of values, made the word Yankee a synonym for shrewd bargaining. Foreigners believe all Americans have the ingenuity of the Yankee and his philosophy has colored their thinking about us. He's more than a trader and a philosopher; he's more like Mr. Frank Lawrence, of Crow Hill, Vermont, a good farmer, who can show most of us a lesson or two about making a living on a handful of rocky soil.

Yankee farmer

BY HAYDN PEARSON
AND JOHN GOULD

They say it was a big wind that blew the Mayflower off her course to Virginia, but there are those in the Vermont hills who will tell you it wasn't chance at all. The Yankee was made for the stubborn, granite hills of New England, and he has perched atop them and worked their sides ever since. The shift in the wind was a good thing, because Yankees would be very unhappy in Virginia. New England was also made for the Yankee, and they go together like pork and beans. His stern and earnest soul weathers the blizzards that flail across the stone walls with a composure that suggests the Almighty knew what he was doing when he shifted the wind.

You can point your finger down about anywhere in the rural areas of the six northeastern states and find a conglomerate Yankee. You could spotlight a Massachusetts orchardist, a sweetcorn man from Sandy River, a timberland man from the Connecticut Lakes, or one of those phenomenal potato barons of way-up Aroostook County—and you'd find each time an altogether different person who typifies and explains the Yankee. They're all alike —and they're all different. Take 'em as they come, and they're New England. Of all of them, one of the most interesting, the most stubborn, the hardest-working, the one with his feet firmest, and probably the most forward-looking is the sturdy dairy farmer of Vermont. Beset by innumerable "di-few-c'lties" and disappointments, he continues to pour his milk into the Boston and New York markets with undiminished — even increased — vigor. Nobody has licked him yet, and everybody and everything has tried.

Take Frank Lawrence of Crow Hill, St. Johnsbury, Vermont. Surrounded by more geographic beauty than you'll find in ten other states, Frank has swung his scythe and carried his rocks to the wall since he was a boy, and at eighty is still swinging and still carrying. His Anglo-Saxon ancestors gave him the blue eyes for looking off from the green hills. These ancestors also gave us people who started things like Harvard, and dumped tea into Boston Harbor, and stood shoulder to shoulder in that hour of darkness and peril and need when the United States seemed like a good thing to originate.

Frank might also point out to you that early poll taxes in other states were paid by people who moved west to avoid being Yankees like him. Good enough people, you know, but flighty. Couldn't settle down, had no gumption to tie to. Lit out when there was work to do. Frank would also explain about Yankees being stingy, close-lipped, nose-talkers, and "dry". Some call it salty. Well, you never know when money will come in handy, sometimes it doesn't pay to volunteer information, what odds how you talk so long as you say something worth hearing, and what harm in a remark that twinkles? You don't live by farming on the hills of Vermont all your life without having some good qualities. A lot of people would be Yankees if they could stand up to the climate and still have something to eat when they put their feet under the table.

So Frank Lawrence doesn't go to pieces when he has a horse to trade; he uses words the way he uses money; he probably doesn't think he's an individualist but he is; and he votes the straight Republican ticket because he never was in love with what he calls foolishness. A man who hustled to finish his row in time for dinner doesn't feel the world owes his neighbor a living. But if the barons hadn't fixed up the Magna Carta, the farmers of Vermont would have come to it in time. You have to put a lot of basic things together to get at Frank's philosophy. Mostly it's just Frank, and he likes the way he is, and you can be somebody else as long as you don't bother him about it, and pay your own bills.

His background and his family, along with his tipped-up acres, are typical of others around him. When he was a lad he saw the old era of New England fade out gradually, until as a grown man he saw farming about as low as the Winooski meadows. Now as an old man he reflects and sees a bright future for his state and his people — an awakening of the old spirit with new purpose, new methods, new blood. And thank God, a proper amount of the traditions. Something old and something new — it's still Vermont and the sun gleams bright on the hills.

The Lawrence farm has been in the family since 1806. That's not the oldest, but it's about average for the early-cleared farms. Fishermen's sons were moving inland from the coast of Maine; folks were working up the rivers from Connecticut; New Hampshire was whetting her ax. Many a young man had hiked his new wife through the woods until they found a likely place to build. And Frank's great-grandfather thought his older brothers hadn't used him right, so he left them with their shipyard in Massachusetts and lifted his eyes to the hills. The house was like others raised in New England around the turn of the century — built mostly of sweat, with "weak heads and strong backs." They gathered the stone from the fields, clearing cropland as they built a house. They swung the broadax against the beams, and drew great upland logs to water mills for boards. They brought in nail-rods, and hammered out fastenings, perhaps a local smith was already there to do it for them. They sent back, maybe to Portland, for glazing — and the wagons toiled up through the notch. That wagon route would be the rail route when the rich country behind the mountains should be opened to the sea.

The farm was self-sufficient. It had to be. The price of things not produced was in terms of things they did produce. You could always work a day for somebody else, and labor was better than money then. The women had their share of it. They helped with the farm work, did the spinning and weaving, and made the food go through the long winter. They raised up sons, too, and a child of four or five was already assigned his woodbox and chicken

THE SLOW, STEADY PACE of home-grown yokes is still the power on some New England farms. They're not too slow and there's no harness to snap when the share hits a rock. The Yankees say oxen are good too, with fried potatoes and pie when other farmers are burying a horse or junking a Jeep. Any heifer or steer can be broken to yoke in a short time, but steers are preferred.

chores. The pioneer days have been carefully treated by scores of New England authors who know a good tale when they hear one. But they were good days, and they set the pace for New England. When mere survival was taken care of those first farmers began sending out their produce. They sold stock, and now and then some garden stuff, and always there were loads of logs and boards moving toward those coastal cities. Cities are always learning but never heeding their sorriest lesson — that you can't harvest on paved streets. The barren predicament of seaboard cities was Vermont's first farm asset, and the thundering milk trains that drive to Boston in the night are the continuing story of that first trade.

Goods seek the market, and if the Lawrences could sell, so could they buy. Up came peddlers and craftsmen — first on foot and then with wagons, and later to set up stores. There were tinsmiths and yard-goods packers, coming on business but welcome socially. Once a year the bootmaker would get around with his traveling shop, and he'd sit in the kitchen door in the sun and peg footwear for all the family. It took more than one veal to copper-toe the children all around. Sometimes a Yankee could dress up his values, and it wasn't always the trader who did the trading. Many a pack peddler came back hoping to recoup last year's sticking, and he didn't joke about Yankee ability at a sharp bargain when he had his goods laid out on the kitchen table. Those early settlers were not the ones to flip down a nickel and say, "Keep the change." A

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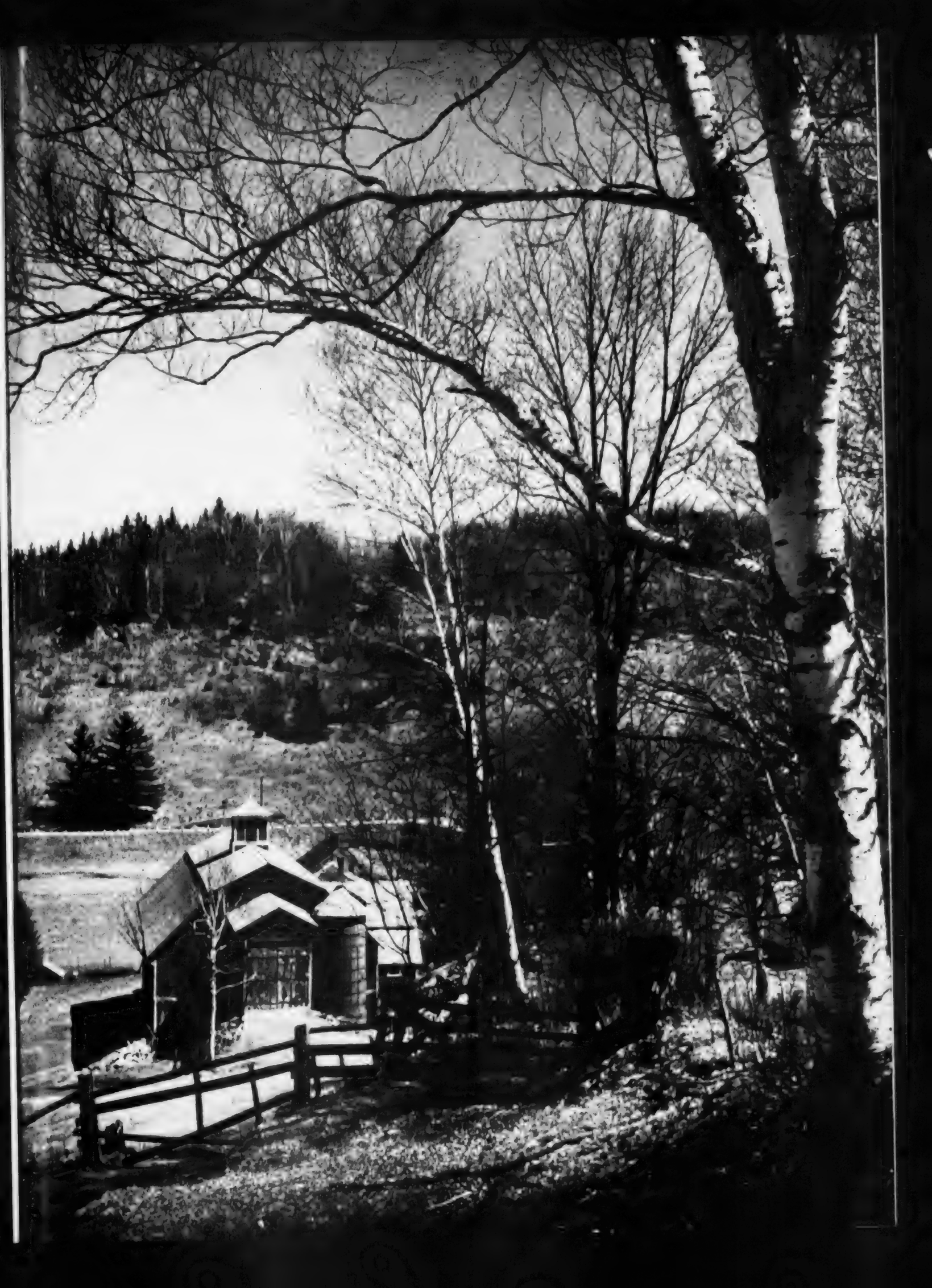
HERE LIVES a Yankee farmer, Frank Lawrence, of Crow Hill, Vermont. Nestling in a little valley, surrounded by Vermont green, the green of Christmas trees, he punches out a living from the kind of soil you would put into a woodlot. Soil and climate have determined his character.



SAPPING'S NO GOLD MINE, but most Yankees make fair at it. It comes at a slack time and the kids and the women make a spring picnic out of the work. Gathering sap on a maple-runner scoot is prelude to feasts of sugar-on-snow and doughnuts dunked in new syrup.

nickel was the price of an hour's labor in the woodlot. Many a farmer raised his family, and raised them well, and never saw $100 cash in a year. So you didn't be generous.

THE AGRICULTURE pattern was good because it was diversified. Money came in dribbles, but it came from many sources and it came the year 'round. You had most all your living, and father always had something to sell. If income exceeds outgo, that's called profit, and the forebears showed a profit by spending less than they took in. Today, in New England, money is considered something to keep. The pattern failed, however, when farming developed into a business. Thrift and work couldn't keep undernourished farm land from failing up. As old folks, satisfied with little died, their children left the farms deserted until every New England state had a deserted farm problem.

The rudiments of almost all modern farm practices were understood and used by Yankee farmers a hundred years ago. Rotation was used, not scientifically, but because observation suggested it. Corn followed potatoes, not because of soil requirements but because potatoes killed back the sod and the corn piece would be fairly free of grass. Plowing under green crops was common. New England soil tends to be heavier, the humus goes deeper, and working in vegetation kept the ground from packing down. Modern farmers speak of aeration, but great-grandfather was satisfied to do it because it seemed to make things grow better. But as the years went by the practice seemed lost without the reasons. Somewhere along the line the margin of profit dropped off and one field after another stayed in hay for years on end. New England soil needs lots of study, and that's the one thing the old-timers didn't give it.

In Vermont the tendency was to change over to straight dairying, buy what you couldn't raise, and cut the hay at all costs. Herds were bigger than the farms could support, and even in summer the farmers were buying feed when their own upland fields cut less than a ton to the acre.

With the industrialization of the region, along about 1875, textile and shoe factories attracted youth off the farms. The shorter day, the higher pay, and even the bright lights looked better than a day in the cornfield. Other factors joined to accelerate the decline. Frank Lawrence sees the picture about like this:

"Along about 50 years ago things around here were bob-sledding downhill, and nobody dragging his feet. We were fitting the Yankee farmer to a shroud and didn't know it. It was along about Spanish War times—just when we might have been getting over the Civil War. You know, this section of the country lost a big part of its future in the Civil War—we've never gained back what we lost in boys and energy. Our farms poured volunteers into the army—some couldn't come home, some didn't. Those that did had hard sledding, and things were about to pick up when we hit another period.

"That was when the cities and the mills called, and some youngsters headed out into the west. In those days our farms stayed in the families, and if they had two boys, one of them worked out. Sometimes he'd save enough to pick up a farm, but often he just lit out and never came back. Those that decided to stay moved out farther onto the back roads, or higher up the hills, and Lord knows the meadow farms never budded gold pieces.

"But in Vermont we thought we found an answer, and that was when the milk business began to slap us around. The cities filled up with immigrants and our own children, and they all wanted milk. It was such a pretty set-up it made a lot of us scrap the old method of self-sufficiency, and we began being dairy farmers. We quit growing grain, and built bigger

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THE YANKEE has never lost faith in Ben Franklin's recipe for health, wealth and wisdom. It's half past nine and time to wind the grampie clock and put out the cat. The cat and the Boston rocker are standard equipment for New England living rooms. Lucky ones treasure their tall clocks, brought in when great-grandfather built the house.

THE FIRST-COMERS up the New England rivers copped the meadow land and the late-comers had to take up on the hills. In the hills they found the birches, which make a hot, quick-starting fire and could serve as a substitute for plaster to brighten cabin walls.

barns for cows. The prairie farmers shipped in our grain, and in a way we stopped being farmers and began operating factories where we took raw materials and turned out milk. We took in a lot of money, but we paid out a lot to feed stores. What you keep is what counts, and we didn't count as much as you might think.

"Milk doesn't make a very pretty story. Hardly any of us are much more than feeders to big corporations that really run the business. Mostly they treat us all right, but I don't think anybody claims they do all they might. When the second World War came along and feed went crazy, some of those companies could have spent something and fought our battles for us—but nothing really successful came about, and times have been wicked. Anyway, it was this milk development that changed the whole farm picture for us, and only lately we began to fight back."

This fighting back has been in the manner of trenchments. The Vermont farmers are working toward self-sufficiency again. They are growing grain, talking land conservation, working together in Farm Bureau, consumer and producer co-ops, herd improvement, even artificial breeding and advertising. Land rejuvenation interests men in manure loaders, pasture improvement, soil testing, new seeds, and long-term rotations. It is interesting to hear Vermonters talk about "salvage values" of cattle, when a few years back they met and talked nothing but milk, milk, milk.

But you don't get New England's picture from graphs and government reports. There is also the grand story of summer people and city folks who buy a farm and commute. The vacation and rustication aspect of New England rural areas has done a lot to the social and cultural life of the old farmer who still works the family acres. To most of the deserted farm stands have come real estate men, bringing cigar-smoking bankers and business men who can look in a back window and see what a few thousand dollars will do. Then these newcomers call the place their "farm", and truth-to-tell some of them have made the old-timers' eyes pop. They bring new tractors and flick-of-the-wrist implements, and paint the place up so the old farmer has to spruce a bit himself, and they buy blooded stock, and pay their taxes the same day the bill comes. They put waste land into white pine plantings, campaign for better roads, take "showers" every morning, and lean over fences just for the thrill of being neighborly. At first they were queers, but they bought eggs and strawberry plants, hired somebody to lay in a "dreen", and paid for everything.

The old die-hards thought they held out all right, but the newcomers called them characters and thought everything was wonderful. Then the "farmers'" daughters got invited to kitchen junkets by farmers' sons, and the tone of both parties went up a notch.

It's hard to put the finger on specific dates or persons in connection with the revival of good farming and the return of the New England hills to production. A generation ago the dissemination of modern agricultural information had slow-going. County agents and home demonstration agents were upstarts with college training, and all they had were a flock of

new ideas nobody had tried out. Frank Lawrence was one of the minority who took up with the new ideas. Perhaps his son, Carl, who now does the farming under his father's critical eye, put in his two-cents' worth. The Lawrences were among the loyal few who kept the county agents from unemployment.

"It's hard to tell just when or how the change came about," says the elder Lawrence. "The valley farms don't run out the way ours do—up here on the hills we really have a soil problem. The soil is on the light side, at least after the rocks have been picked, and it doesn't run any too deep. All the fields have good high walls around them that date back 150 years. An artist woman came up here once and said, 'The pioneers certainly had the spirit of true art to put those stones around in such pretty chains.'

"Well, the walls are pretty enough. I like them, but they weren't laid up for artists. It was the way they cleared land, and they got a fence for free. Grandfather said a rod of wall with a pair of oxen, a stone boat and two men was a good day's work. Then through the years we've kept picking rocks, because the frost heaves new ones every spring. Walls were horse-high and hog-tight, and the stock kept bushes from running along them. When they got a field cleared and a wall around it, they hauled on some manure—and that was farming. But it didn't hold up on these hill fields, and most of us had a natural interest to learn what we could do to bring them back."

It stands to reason a man would as soon have three tons of hay off three fields, and the farmers found out how that could be done. It's still rather localized, but at least some New England farmers support it as a program.

Increased production on a given acreage naturally leads to diversification. Vermonters are growing more and more grain, and they are finding that acreage yields compare very well with those of the so-called grain belt. In fact the diversified farming can beat the records of specialists. A man with 500 hens naturally has hen manure. Hen manure makes corn stand up and holler. Some men have got better than 60 bushels to the acre the first time they tried corn—shelled, too. So these men grow pigs, and raise their veals up to fat steers. They work a little manure around berry patches, and put a peck by each apple tree. Things spread out under this kind of a program—soon the farmer is packing potatoes in supermarket half-peck bags, and selling honey he gets from the bees he finds necessary to fertilize the cucumbers he raises for the factory.

Men who still stick solely to dairying have seen their averages drop off all during the feed shortage caused by the war. The little red meal chest is back in the pantry, too, and housewives make barley cakes, and buckwheat griddles, and real old-time water-ground cornbread. The

CONGREGATIONAL probably, but it may be Baptist, Universalist, or Methodist, the traditional New England church has the lines of the town meeting house with a spire.

THE COUNTRY EDITOR and the farm wife who writes "items" for the paper are cousins of the kitchen printer whose spare time specialty is sale bills and calling cards.

HORSE-SHOEING has fallen off since tractors came in. Farmers do their own, truck their horses to the few remaining shops, or a traveling farrier comes to the dooryard.

A FORKFUL of fragrant June hay and a measure of grain for each animal and then you naturally sit a minute and relax, listening to the chewing and the rustling.

rotation system has lengthened. "Potatoes this year, corn next" has gone into a long-range program under which the farmer looks ahead ten years to the barley from the lower field. Pastures are in grass longer, hay is baled in the fields for economical storage, silage is a studied conclusion to a careful plan. Superphosphate is a must in the barn manure trench, lime is bought by the ton, and almost anybody can spot magnesium deficiency when he sees it.

The grain growing brings great satisfaction. Farmers who never raised grain stand and smile at their fields. Experiment stations are at work on seeds. Rustless oats were once unknown, what with New England's fog and river damp. One summer in ten was long enough to grow corn—now you can wait until June, plant hybrids,and have a crop by mid-September. Neighborhoods join for the harvesting and threshing again—one man brings his reaper, another his power plant, and a third his threshing machine. Even combines, the pride of the golden prairies, are fairly common in New England now, and they'd have more except nobody can find any to buy. Small fruits and orchards are going in; hundreds are already in bearing. County agents have done a good job. People no longer put apple trees on their run-out fields and expect a crop. Apples grow on rich soil, need cultivation and mulch. Many a milk farmer has found that hay is worth more in apples than it is in milk, and they mulch the hillsides generously.

New England's growing season is a short burst, the glacial soil is unique, the moisture of the land and air never fails completely, and the markets are close. These facts make it theoretically possible to compete with more favored farm regions. Indeed, some of these facts actually make New England the most favored of all, but other regions don't see it. "You don't talk about farming up here in this country the way you do in Iowa," says Carl Lawrence. Folks in New York's Cherry Hill Valley, the flat corn belt, the irrigated far west, and even the most-of-the-best country in the south look at New England and wonder why anybody tries to farm at all. A stranger riding across Vermont on Route 2, twisting in and out, up and down, seeing nothing but small side-hill fields, rocky pastures, and brief meadow lands would say, "No chance to farm here." They tell the story of the Vermont farmer who fell out of his cornfield three times in one morning.

You may have to spray thick lime-sulphur on the McIntosh trees all through a misty summer to lick the scab. But a real Yankee-grown McIntosh is the result, and nobody anywhere else has ever produced equal flavor. The buyers in New York and Boston know the difference. It isn't a long haul across the country to the market, either, but a man can hop in his truck after milking and be home again in time

WINTER COMES early to the New England hills and stays late. Before the days of ski trains and snow plows villagers hibernated after the first heavy snowfall and the tight little package of church, grocery and blacksmith shop served their needs until the snow left in the spring. It wasn't a bad time, for there was no work except the chores and rock maple fires make good setting.

for supper.

Most important of all, in this awakening era, is the hold-over of antique Yankee philosophizing. You don't put all your eggs in one "barskit," of course. The Lord will provide, but you do what you can in the meantime. Him as has gits. You can't put out what you don't have. And the gait of the steers tells who trained them. New England has small farms and small farmers, but life has always run deep and it is the little things that count.

Once again, the farms are sending out lumber. Pine, spruce, popple and fir has gone to pulp mills. More and more woodland products come from farms in small quantities, where back a few years they came from the wild lands and the big operations.

Yankee pastures were always a joke. Land that wasn't good for anything else went to pasture. Cows picked between the rocks, junipers, scrub-pines and bull-pines to find a living. Carl Lawrence feels the best indication of rejuvenation comes from the fact that farmers are working on these pastures. Sometimes this is just an application of bag fertilizer—because rocks are still the best crop. But some farms have planted the back pasture to Christmas trees or quick-growing pulp, and have put good tillable land into pasture. Then they rotate crops, build up the soil, and finally get to a forage crop specially needed for summer feeding. A few years back winter rye was a rare sight, but now whole hills are as green when the snow goes as they ever were in mid-June. If things go well the rye is turned under in late May or

June— but if it comes off wet it means a crop of grain, and another try next September for a green manure.

A SURVEY last year of needed farm equipment was expected to show how many plows, combines, rakes, and tractors New England needed. Instead, it came up with a list of ten most desired articles, and only two were non-electrical. One of those was linoleum! New England is supplied mainly by private utilities, and a few years back they grumbled at the cost of delivering power out in the country. But their corporate heads have been penetrated, and most of them are now very liberal toward farms. And why not? The farmer uses far more power than his apartment friend, and a well equipped farm is almost as good a customer as a small mill. In fact, some farmers run mills —shook bolters, maybe, or cider presses. Mrs. Frank Lawrence probably speaks for every farm housewife, "It's a blessing! The men brag about lights in the barn, and come home every week or so with a new gadget, and nobody ever speaks about electricity in the house. I like electricity too. I used kerosene lamps for years, and slobbered over a scrub board in a wooden tub, and went for years at a time without taking the sad-irons off the stove. Now I enjoy life, and I think the best friend I have is the man who comes and reads the meter."

The up-and-coming Yankee farmer has a medium-tractor and what implements and tools his own place calls for. Hay loaders and side-delivery rakes are common. Buck-rakes and field balers are coming along fast. Tractor driven potato diggers, orchard sprayers, and other mobile pieces are common.

"I've seen things make the cycle," says Frank Lawrence. "I recall when oxen gave way to horses, and now the tractors are taking over most of the work. I think Vermont hill farms will shortly grow enough to support combines. And while we won't see oxen at work again, at least the cycle has gone around until our dairymen aren't ashamed to fatten some steers for heavy beef."

A LOT of people think the New England winter plays a part in the shaping of Yankee character. Probably it does, but it isn't really a bad time. To an outsider it seems as if life for a Yankee farmer is made up of working all summer to live through the winter to work all summer again—and if you want to insist, that's about the size of it. Any discussion of winter's advantages become poetic rather than actual, and if there's anything a Yankee farmer detests it's getting poetical about winter.

Nature takes a rest through those snow-driven months, and man is just part of nature. There are things to do in the winter and they get done. There is also time to sit around and read, and if you have a shop with an airtight stove you can really enjoy yourself making things. You have next winter's wood to get out, and some long logs to haul before the snow gets too deep or the ground thaws again. The good housewife has a full cellar and a full attic. The Yankee farmer doesn't sit down every Christmas and make out a list of his advantages, and he doesn't like the north wind any better than anybody else. But he takes things as they come, and the most you'll get out of him is, "Oh, winter's all right."

Winter makes a good time, too, for going around to see things you want to look at. There used to be a time when a neighbor would wander in out of a storm and play a game of checkers, and then weeks would go by without company. But highways are kept open now and nobody is

THIS IS BREAKFAST, but it could be dinner. Pie and fried potatoes for breakfast come often. The Yankee is a good feeder and the womenfolk are famous for their receets which make good vittels from ordinary things. Great store is set on water, and clear, sparkling springs determined the location of many a New England homestead.

isolated above a few hours.

County agents keep thinking up new thinks to meet about. One night it's buck-rakes, the next freezer techniques, then breeders' meetings, pomological societies, co-op meetings. When nothing else is going on the children have a 4-H gathering, or mother takes in the Stitch and Sew group. People on New England farms, nowadays, think nothing of trips to the city, either, and when somebody agrees to stay home for chores the rest of the family may pack up and go to the Ice Follies in Boston.

Right now New England farmers seem to be getting ready to fight the "centralized school" idea. Yankee towns are solely a New England proposition, and school authorities have become academic when they should have been realistic. Farmers appear to have rested out the preliminary stages; the next generation will have to do double work. Farmers are beginning to feel somebody has missed the point. Rural schools were closed and children transported to the villages because of certain advantages. It now appears that many of these advantages were both non-existant and expensive. Farmers see that the nation's biggest worry today is centralization of non-productive populations. Most of the lessons worth knowing are out in the country. Furthermore, a farmer whose rural home is as modern and well equip-

(Continued on page 115)

THE TOWN CLERK is a power in the village. In a community of shrewd men he must be shrewder, a Solomon in judgment and a trader of skill. His duties range upward from permits for the use of dynamite to advice on unemployment compensation.

THE POST OFFICE carries on where the country newspaper leaves off. Clearing house for male and female gossip, locale for trading bouts, the P. O. is a message center for friends and relatives who can't get in for the day. The bench is for patriarchs and small boys only.

GOATS are no joke

By Mary L. Farley

IF YOU want to make a dairy goat owner hopping mad, ask him, "What do you do with the milk?". After he simmers down he will probably tell you that he and his family prefer it to any other milk and any excess he sells for 40 cents a quart.

Some people raise dairy goats to produce milk for foxes or dogs; it develops superior pelts and show animals. But most goat milk goes for family use or is sold to people who prefer it or have some stomach disturbance which goat's milk eases. If present prices of good milking stock continue, and there is every likelihood that they will, since there is an increasing demand, the old adage about separating the sheep from the goats will have to be revised. Today a good purebred milk goat will cost you from $75 to $200. Kids from good milking strains will cost from $40 to $100 at five months.

For a one word description of all goats there is nothing better than *capricious* — which, reasonably enough, comes from the Latin word *caper,* meaning goat. That is as far as a sweeping statement about goats goes, for there is as much difference between the scrub goat and the well-bred dairy goat as there is between the burro and a fine saddle horse. Unfortunately for the goat industry, the public has formed its opinion of goats from the long-horned, ill-tempered, bad-smelling backyard buck, the villain of jokes and cartoons.

Who Keeps Goats?

Goat owners, like all Gaul, are divided into three parts: commercial milk producers, which include manufacturers of cheese and of evaporated or powdered goat milk, as well as operators of dairy farms for the sale of the fluid milk; breeders, who use the milk produced largely to raise choice stock for sale; and by far the largest group, the owners of small farms, who keep goats primarily for their own use.

The average cow needs three tons of hay each year even with good pasture and for a year around milk supply, two cows must be kept. This means six tons of hay, which is more hay than many small farms are set-up to raise, cure and store. Furthermore, two cows produce more milk than the average family normally uses.

Three goats will manage very well on one ton of hay with good pasture and will give the family a year around supply of milk, at one quarter of the cost and with less effort than is required to maintain two cows. Since they are an essentially clean animal, they may be kept in quarters which would be unsuitable for cows. They may be taken to the buck for service in the family car. Because of their economy and convenience, goats are rapidly reaching the popularity in this country which they have held in Europe and Asia for many generations.

The Four Popular Breeds

The most popular breed of goats in America is the Toggenburg, which originated in Switzerland. They are brown in color, have white legs and white facial markings. Their hair is slightly longer than the other dairy breeds. Their ears are erect and pointed. Toggenburg fanciers insist that they are more rugged and less temperamental than other breeds, and certain it is that their uniform markings lend eye appeal to the herd.

Nubian goats, the second most popular breed, are distinctive in appearance and easily recognized. They have long drooping ears and a marked Roman nose. They are short haired and may be of any color, white, black, brown, any combination of these colors, or any of these colors with lighter or darker spots. They are often called the "Jersey of the goat world", because of the high butterfat content of their milk.

The Saanen breed has always been very popular because of its very high milk production and trim appearance. Saanens are all white and a herd which is kept immaculately clean is a beautiful sight.

Some Saanens does are inclined to be nervous; most are of a feminine type, having a good dairy conformation with large, well-shaped udders and teats.

French Alpines are not so numerous as the other three breeds. They are a beautiful, short-haired, fawn-like goat, with wide variations in color and marking, the best known pattern being the black and white "cou blanc". Another typical marking, the "cou clair" is a soft brown shading into black in the hind-quarters. French Alpines are alert, large and give excellent milk and butterfat yields.

Grade Goats

In addition to the purebreds, there are the grades. They show characteristics of blood lines drawn from the four recognized breeds. These animals will sell at a lower price. For the commercial dairy or the family goat they often serve just as well, producing good milk and butterfat yields.

Goats have only two teats to the cow's four. Goat's teats are usually larger than those of cows, and they are much easier to milk. A mature doe weighs 110 to 160 pounds, and a buck 150 to 220 pounds. Does generally throw two or three kids, seldom one or four. The weight of kids at birth is close to that of a human baby—from 5 to 10 pounds. About once a year kid quintuplets make a cute story for the Sunday feature sections. These multiple births do not create the orphan problem for the goat raiser that they do for the sheepman, as kids are usually taken from the doe at birth, before she has had a chance to own them. She transfers her affection to the milker. It is important, however, that the kid be given the first milk, or colostrum, from its mother, for this contains vital properties for the start in life. Pan or bottle feeding until kids are at least five months old is the usual schedule. Where the goat's milk is needed for home consumption or for sale, the kids may be raised on a combination of goat milk and skimmed milk.

Feeding The Kids

For the first two weeks a kid should have a regular "baby schedule" of 4 milk feedings of ½ pint each day—approximately 6 hours apart. If it is making good growth at that age it can be put on three feedings of 1 pint per feeding. If goat milk is scarce a mixture of 3 parts whole goat milk and one part skim milk mixture can be substituted, when the kid is about a month old. The skim milk mixture is made by mixing 1 pound of dried skim cow's milk with 9 pounds of hot water. The dried skim milk can be purchased from feed dealers, dairies or ice cream plants. The proportion of skim milk mixture in the combination with whole goat milk is built up until at the age of 3 months the kid is receiving a formula of ½ whole goat milk and ½ skim milk mixture. This mixture should be fed until the kid is 5 to 6 months old. Kids should be kept in separate pens and have the choicest hay available. In feeding milk it is important to have the temperature at 105-110 degrees Fahrenheit. Feeding cool or cold milk is about the quickest way to bring on the unfortunate condition known as "the

MIXED GRAZING of goats with other farm animals works well. Goats will thrive and increase on weeds and bushes that would be untouched by cattle or sheep. This herd of grade goats and sheep is being used to clean up western range pasture land.

GOAT ADVANCED REGISTRY
MILK AND BUTTERFAT COMPARISON TABLE

BREED	OFFICIAL MILK (1) PRODUCTION RECORD	OFFICIAL BUTTERFAT (1) PRODUCTION RECORD	LENGTH OF TEST	OWNED BY
Toggenburg	"Sunshine Fink's La Hoya ****M"(2) 4422.5 pounds of milk This goat produced approximately her body weight in milk every ten days, the butterfat content of which equalled 5 pounds of butter.	"Sunshine Fink's La Hoya ****M"(2) 151.97 pounds of butterfat	10 months	Mrs. J. B. Mantonye, Albuquerque, N. M.
Nubian	"Chikaming Shasta Caesarea **M" 2384.9 pounds of milk		10 months	Both Goats owned by Mrs. Carl Sandburg, Flat Rock, N. C.
		"Chikaming Pierrot Allison ***M" 136.264 pounds of butterfat	10 months	
Saanen	"Three Oaks Blossom's Charmaine" 4161.7 pounds of milk		9 months, 8 days	O. T. Hess, Reedly, California
		"Rio Linda Dona Marcelina *M" 153.69 pounds of butterfat	10 months	Glen Daly, Payson, Utah
French Alpine	"Little Hill's Pierrette's Lady Penelope *M" 4632.3 pounds of milk	"Little Hill's Pierrette's Lady Penelope *M" 132.749 pounds of butterfat	10 months	Mrs. F. N. Craver, El Paso, Texas

(1) Tests were under the supervision of State Universities and were subject to the same Dairy Science Association Rules as used for Advanced Registry cow testing.

(2) An "M" with single or multiple asterisks after a goat's name indicates the animal is a Star Milker. Star Milker is a designation for a doe which has made a total of 18 points in a recognized milking competition, or on a single test day under the supervision of an A. R. tester. Points are allowed for: (1) each pound of milk, (2) each complete ten days the goat has been in milk since the last kidding, and (3) each .05 pounds of butterfat yielded in the test milkings. For instance, a doe might make Star Milker with 10 pounds of 4% b.f. milk or 12 pounds of 3% b.f. milk in 24 hours milking. The goat is stripped dry exactly 24 hours preceding the final milking in the competition in the presence of an authorized official. She is then milked either twice or three times in the 24 hours. Does inherit their Dam's stars; that is, a Star Milker daughter of a Three Star Milker becomes a Four Star Milker. Bucks win one star on their ancestry and one on their progeny, and can win no more than two stars. This plan of quality designation of performance in does and prepotency in bucks has been used in England for years. The American Milk Goat Registry Association, Sherborn, Massachusetts, has available Star Milker and Star Buck Applications and Rules.

KIDS ARE AGILE, playful and great fun to watch. The three-month-old Toggenburg shown below is doing a series of barrel tricks for her own amusement. While it met with only a blase reception from her caprine audience it was a delight to human watchers. Kids should have a play-yard in a sunny location. It should be equipped with boxes and barrels. A teeter-totter will be used incessantly.

scours". There should be oats and alfalfa hay where it can be easily reached from the time the kid is a month old. When the kid goes off milk it should be fed all the hay it will eat and about a pound a day of some low protein content grain mixture. A recommended mixture is as follows:

30 pounds cracked corn
30 pounds oats
10 pounds wheat bran

Buck kids that are not being reserved for breeding purposes should be castrated at 2 months of age and butchered at about five months, when they should weigh about 75 pounds. Goat meat is considered a great delicacy by most foreign born Americans, and goat breeders who can eliminate the sentimental attachment to their animals feel the same way. French restaurants in New York bill it on the French menus as "chevon" and on the English side as "lamb". If the butchering is done by an expert the skins can be sold for 50c to 75c to wool and hide buyers. If you haven't the heart to eat the kids they can always be sold to an Italian grocery for $5.00 at 3 or 4 months.

Horns Make The Devil

The amount of meanness in a goat is almost proportional to the length of the horns. A pugnacious goat will "get religion" with the removal of a pair of formidable horns and overnight become a docile and cooperative part of a herd. Goat raisers are breeding for hornless kids, and a good percentage of the dairy goats do not have horns. A kid that is born with horns is usually disbudded at the age of two to five days with either caustic potash or a red hot iron. Of these two methods the latter is preferable as there is danger of the potash running down in the eye even though the head of the kid has been heavily greased to prevent this occurring. The novice goat-keeper shys at the dehorning operation, but the pain lasts for only a minute, and if the burned area is

THE FAMILY MILK SUPPLY can be taken care of nicely by two good milk goats. This purebred Alpine doe, owned by Mrs. Arthur Motch, is almost fawn-like in her *cou clair* marking of tan shading into brown. Her udder development and shape are normal and are good indications of her milking ability. She has been handled with the same care given other valuable farm animals, and when this photograph was taken, a year after freshening, was giving between 7.8 and 8.0 pounds of milk a day. "Temple Hill Mary", AMGRA #75666, averaged slightly over 10 pounds of milk a day when she first freshened, and her yield was consistant during the year.

GOAT MILK SPECIALTY developed by Frank Helm at his Grass Lake, Michigan farm Is dehydrated milk which is shipped all over the country. The milking room is sunlit, airy and spotlessly clean. Three men handle and milk the 176 Saanen does. The does are trained to come to the entrance of the milking room when their number is called, thus speeding up milking and record-keeping.

properly treated with Unguentine the kid will rejoin the other kids and be playing in five minutes. Certainly it is much more humane and less bloody than delaying the horn removal until the goat is older and the horns must be sawed off. If the horn bud is properly destroyed, horns will never grow and it takes an expert to tell that the animal is not naturally hornless. A horned goat should never be pastured with valuable hornless animals. There is too much danger of ripped udders and injury to the unarmed members of the herd.

Goats and Dogs

Goats are highly intelligent animals, although at times they can be as stubborn as mules about their own ideas, and at others, as mischievous as monkeys. If they are kept clean and treated kindly they make excellent pets. It is even simple to house-break a young kid. In many herds a huge buck may be the family pet, as well as the herd sire. He will follow children on walks through the woods like a dog, or will pull a small cart like a pony. Goats are rarely shy and instead of running away from a stranger, as sheep will do, their curiosity will bring them up to give him the once over. It is these same qualities which make them much less vulnerable to dogs than sheep, as they will stand their ground and fight it out with their heads and hoofs. Some sheep owners keep a horned buck of fighting propensities with their flocks as a guard. Another colorful use for bucks is to keep them with highly bred race horses; the goat's even disposition usually proves to be a stabilizing influence on the skittish horse, and they become affable companions.

Because of their smaller size as compared to cows, goats can be easily handled by women and children, and even breeding does not require the strength of more than one handler for controlling the buck. The milking is usually done on a low stand, about 18 inches in height, which has a stanchion and provision for feeding grain to the doe. Occasionally there are does that do not like to be milked, but ordinarily they will jump readily on the stand and munch contentedly while being milked. Europeans frequently milk fractious goats from the rear. A milker is safe at this end since a goat can not kick backward. The milk pail is safe too. But most people milk them from the side as they do cows. The goat's tail is short like a rabbit's or deer's and doesn't swish in the milker's face. Ordinarily a goat is milked twice a day. To get the maximum yield as breeders do who are hanging up a record, goats are milked three times daily, as with cows.

Goats' milk is nearly white in color and even in abundant pasture season does not take on the yellow color of cows' milk, due to the more thorough conversion of carotene to Vitamin A in goats' milk. It is naturally homogenized and although the cream does not rise as ripidly upon standing it can be easily separated in a cream separator. It churns well and makes an extremely fine textured butter of good keeping quality. If the user feels that butter must be yellow to be appetizing, goat butter has to be colored with vegetable yellow, as it is naturally pure white. From the cream snowy white, fluffy whipped cream, that is highly appetizing, can be made.

Goat Milk Facts and Fancies

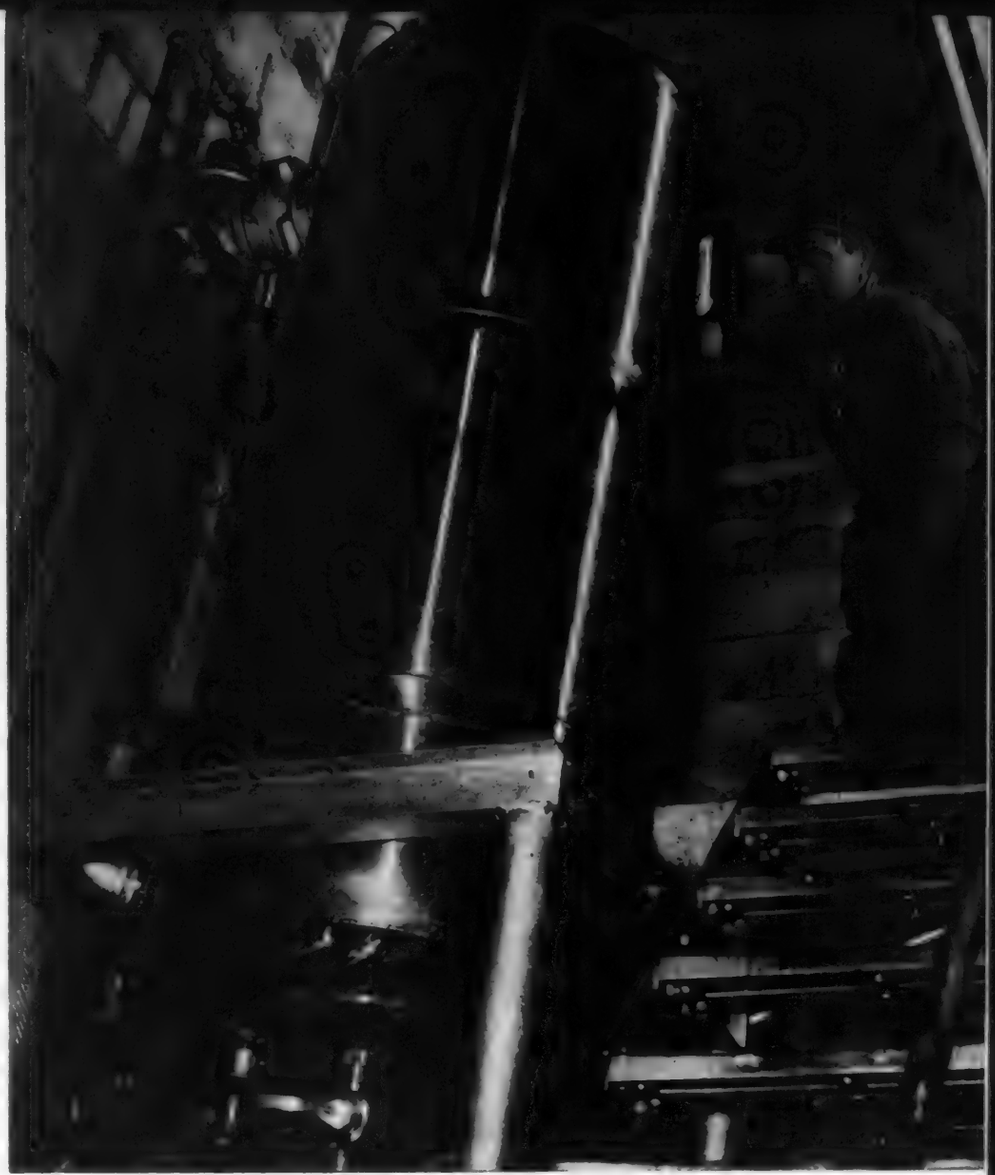
Some people have had the misfortune to taste goat milk that was strong. There are several reasons for strong goat milk, according to goat dairy people: (1) the milk is from ill-kept animals, (2) it has been milked under unsanitary conditions, (3) it has not been properly cared for after having been taken from the doe, or (4) the goat has been given strong flavored feed too near milking time. Properly produced goat milk will be hardly distinguish-

able from cow milk except in two respects. Most goat milk has a slightly higher butterfat content as whole milk which gives it a richer flavor. While the milk from some goats will have no higher butterfat content than cow milk, tests have shown that Nubian goat milk is consistantly richer than Jersey cow milk. It seems to be lighter than cow milk which is indicative of its easy digestibility. According to the University of Missouri Experiment Station figures, 23 per cent of the fat globules of Holstein cow milk—the smallest fat globules of any of the dairy cow breeds—are below 2 micra (2/25,000 of an inch) in diameter. Samples of goat milk examined showed 57 per cent of the globules below 2 micra. It is believed that the smaller fat globules together with the alkaline reaction of the milk are the properties that make it one of the most easily digested foods.

The dairy goat industry has been handicapped by claims of some of its overenthusiastic members, who would have you believe that it will cure anything from dandruff to stomach ulcers. Physicans are are often asked to substantiate the miraculous cures that are reported to have come from the use of goats' milk. John D. Clark, M.D., of Abington, Connecticut, writing in "Better Goatkeeping", of his own experiences with such cases points out, "The cured goat milk enthusiast must not assume that because his asthma, stomach ulcer, arthritis, or eczema was relieved by drinking goat's milk that everyone else with apparently the same trouble will likewise respond favorably. That many of these cures would have taken place had cow's milk been used and well-digested, there can be no doubt, but that there is a clinical difference between cow's milk and goat's milk is a conviction of those of us who have used and know goat's milk. Many an individual's alimentary tracts will digest, absorb, assimilate or metabolize goat's milk more readily than cow's milk. This may be due to an allergy for cow's milk and not for goat's milk, but the number of such cases seems far too large for this explanation. That goat milk is different is a growing conviction and science will eventually explain it."

Fencing For Goats

Goats are not as easy to fence in as either cattle or sheep, as they consider escape from a designated pasture a fair game for the exhibition of their intelligence and skill. It takes a 48-inch woven wire fence to restrain them, and the braces on the corners should be attached low enough so that they cannot walk up them and jump over. Many goat owners have had success with electric fences, except in the very dry season. It is necessary to have two hot wires to keep grown goats in the pasture, and a third, low wire will be needed if kids are kept in the same field. If the pasture does not contain suitable grass and weeds it is difficult to keep goats inside with any kind of a fence. Tether-

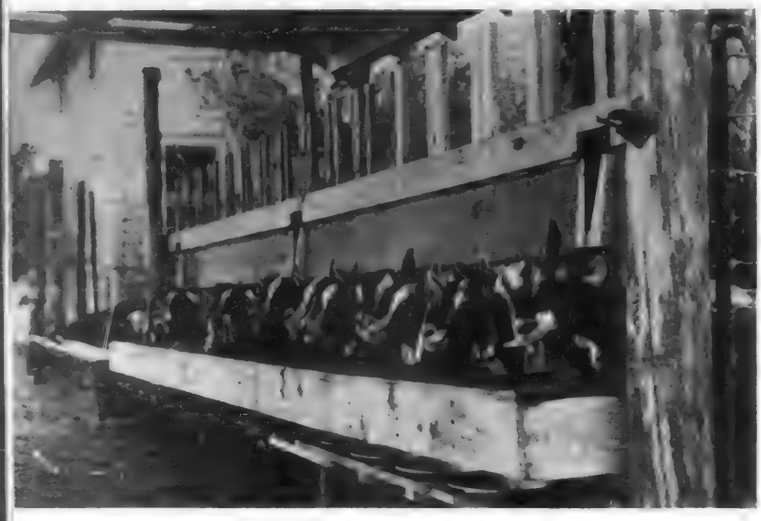


CHECKING THE TEMPERATURE of the stainless steel condensing pan is part of the operation of producing high quality dehydrated milk at the Helm Farm. After being pre-condensed in this pan the milk is spray dried before being put into cans.

FOSTER MOTHER to animals as well as humans, the goat has willingly contributed her healthful milk for others' welfare for centuries. Mrs. Blanche McCullough has raised 17 calves on goat milk. Produce men say her calves are best that come to market.

PAN FED kids make just as rapid growth as those left with mothers. This day-old Nubian kid quickly learns to drink from a pan after it becomes hungry.

A SUCKLING KID is less trouble to the owner; this Toggenburg kid was raised by mother. Goats have chewed siding in search for bark and wood, essential to diet.



CHOW TIME for 16 of Mrs. Carl Sandburg's Toggenburgs. This outdoor feeder has individual pans for each kid. Drop board holds kid in its own stanchion.

HERD SIRES of the Nubian breed. Mrs. Robert Campbell's "*B Chikaming Andrue" is on picture left; "Bay State Beau Andy" is on right; both bucks are hornless.

ing on a rope or chain has never proved very satisfactory as most goats will worry off more flesh in trying to be rid of their collar and chain than they will gain from the grazing.

Goats Require Adequate Housing

Goats are hardy animals and they can stand a lot of abuse, but no thinking goat owner is willing to handicap his herd by failing to provide adequate shelter in warm climates, and a light, warm and well-ventilated small barn in the cold climates. Goats like to sleep on a shelf or a box, and this had lead goat owners to develop a special kind of tie stall. Stalls are from six to eighteen inches off the ground and have slatted floors. Goats do not mind cold, but they abhor dampness and should be kept out of drafts. Since the droppings of a healthy goat are hard pellets about 3/8 of an inch in diameter this slatted floor arrangement allows them to fall to the barn floor where they are more easily collected. Goat manure is one of the best fertilizers, and it is valued as highly as sheep manure by market gardeners.

Does that are near kidding and those that are housed for a large part of the year should be kept in box stalls which need not be more than three by six feet. Kids should have a separate pen where they have access to oats and hay, with some provision for holding individual pans or bottles of milk.

A goat is naturally a clean animal and so fastidious in her habits that she will go hungry rather than eat stale grain which some other goat has nosed over. Nor will a goat drink water that is tainted; in winter for best milk production the water should be warmed. In feeding hay, the big problem is to provide clean hay and to prevent the goat from pulling it out, nibbling the end off and dropping the rest to the floor, where it makes expensive bedding but will never be eaten. The best method of hay feeding so far devised is a manger with a keyhole opening. The goat must put her head in at the large upper part and then lower it to reach for the hay. This makes it much easier for her to keep her head in the stall and eat, than to constantly pull off wisps of hay, and it eliminates most of the wastage.

Milk Costs

Although feed costs vary greatly in different parts of the country, and the varying number of months of pasture is another cost factor, a safe average figure for feeding a good dairy goat, at

current grain and hay prices, would be $18.00 a year, from which the owner could expect to receive about 1500 pounds of 3.5 to 4.0 per cent butterfat milk. Most goat owners allow 6 to 8 weeks drying-up period before a goat freshens so the milking period is usually about 10 months of the year.

Goats are productive from 8 to 10 years. The lactation period of the doe that is not bred is often from 15 to 24 months.

Most of the feeds that are good for the production of milk in the dairy cow are also suitable for the dairy goat. Does that are being milked should be given all the roughage they will eat. Alfalfa and clover hay are the best for milk production. An essential part of their diet is succulent feed such as mangel-wurzels, kale, carrots, rutabagas, parsnips, beet pulp, and turnips. A recommended daily winter feeding program is as follows:

HAY (1)

Goats will eat about 2 to 2½ pounds of good quality alfalfa or clover.

SUCCULENT FEED (1)

1½ pounds, either chopped or whole, whichever are eaten best.

GRAIN (2)

2 to 3 pounds, depending on the amount of milk the doe gives.

WATER

Plenty of fresh, clean water, warmed in cold weather.

SALT

Individual iodized bricks in each stall.

A grain mixture, containing approximately 16% protein, which Mrs. Frederic Knoop used for her Fensternol Nubian Herd at Amelia, Ohio, is given below. This mixture gave high milk production on Advanced Registry Tests:

75 pounds of oats
75 pounds of crushed barley
(can be replaced with cracked corn)
25 pounds of wheat bran
25 pounds of linseed oil meal
—— (in pellet form, if available)
200 pounds

In feeding goats one must constantly keep in mind the animal's personality. The urge of the goat's hunger is not nearly as important as the intelligence of the owner. A goat's curiosity and love of variety must be satisfied in influencing her appetite, capacity to eat and assimilate. Each doe should be fed in a separate bucket or pan so that she can be studied. "Rules of Thumb" are not accurate feeding guides. They underfeed the high producing does, and overfeed the low producers. One such rule is "a pound of of grain should be fed for every quart of milk produced." F. B. Morrison's "Feeds and Feeding", published by The Morrison Publishing Co., Ithaca, New York, is recommended as a complete feeding guide for goats as for all animals. In his feeding tables in the appendix, Professor Morrison gives feeding tables for cows on and off pasture which can be adapted to goat feeding by using the goat's weight instead of the cow's. He takes into consideration such important variables as quality of hay, pounds of milk, and percentage of butterfat in the milk, in making feeding recommendations.

A number of commercial mills sell goat feed in loose and pellet forms. One of these mixtures, made by Purina Mills, is available throughout the country. It contains molasses and most goats relish this dividend.

A doe that is being given ample amounts of quality hay, succulence, grain and iodized salt, and is on good pasture, should be fed mineral supplements only when a veterinarian decides there is a mineral deficiency, and then only those specific substances should be used which correct a specific deficiency. Indiscriminate "shotgun" feeding of complex mineral mixtures is not considered to be sound feeding practice.

There is a great difference in goat's appetites, and an individual doe should never be given more grain than she will clean up with the first rush of eating. Beyond this she may nibble a bit but eat no appreciable amount of the grain. There is no better feeding motto for goat owners, than the old adage, "The eye of the master fattens his cattle".

GOATS ARE EASILY milked by women or children because of the size of the teats, which are much larger than those of cows. For cleanliness, a simple stand is used.

Goats Prefer Poison Ivy

Mixed grazing of goats with sheep, cattle or horses works well. For cleaning up unused land or scrubby hillsides there is nothing so useful as a herd of goats. Goats are naturally browsers. Their primary interest will be in poison ivy and blackberry briars, and after they have finished these off they will go after other weeds. The grass will be last on their menu. Grazing on ivy and other weeds has no apparent effect on the quality of the milk.

They like tender-barked trees such as the young locust or, alas, a cherished apple tree, which soon will be stripped and killed by a few goats. A herd of goats and a flock of sheep grazing togther on a neglected pasture will do wonders in a single season; the goats eat high and the sheep eat low. The worst enemy of free grazing goats is the wild or choke cherry. At certain stages of growth, or when the leaves are wilted, this plant has prussic acid present in the leaves, which poisons goats. A pasture should be examined for cherry and for sheep laurel or lamb kill before goats are turned into it. If either are present, they must be removed.

(1) Hay and Succulent feeding may be decreased by one-half in the summer if there is an abundance of pasture, and there are leafy briars and tree leaves available.

(2) A 16% protein content in a grain mixture is the top figure for feeding milking does.

Pests and Diseases

Spring and fall treatment with Phenothiazine capsules is a safe and effective way of controlling the stomach and intestinal worms that pester goats as they do all ruminants. Phenothiazine gives the milk a reddish color for a day or so after treatment, and it is usually not used for human consumption during this time.

Goats are tested for Bang's Disease in the same way as cows or any other animal, and the records of various state and government departments show that they are no more likely to be carriers of undulant fever in milk or meat than any other animal. Most goat owners have their animals tested twice a year, and are extremely cautious about bringing strange animals into their herd for breeding or boarding. Producers of certified goat milk, which is not always required to be pasteurized, but must meet a number of stringent tests, are required to test oftener. It is known that goats in hot climates are more apt to have the disease than those in the cool climates.

The Problems

But there are flys in the ointment for the person who is considering goats as a farm specialty. First, they are seasonal breeders. They can be bred from September to February in most of the country. In the southern states the season may be a month or two shorter and in the northern states a month longer. It is difficult to maintain a year round uniform and adequate supply of milk for a goat dairy or cheese plant. Careful selection of the most persistent milk producers in a herd to be held over for the final estrum of the spring in February and March brings them fresh five months later in August. If good hay is available these does will be producing well at Christmas time, which is ordinarily the start of the milk-scarce season. Balancing the herd between very early breeding in late August and very late breeding in February is not as simple as it seems—on paper. Only the breeder who is working constantly with his animals and is sensitive to their moods and dispositions can tell when they are in season, especially in the periods in February and March, for estrum may last only a few hours. Hormone injections have been used with moderate success by breeders to bring goats in season in the late spring months and the early fall ones.

The second problem in the goat milk specialty business is pasturization, which is required in selling milk in most cities. Goats do better in small herds—15 to 25 milkers handled as a unit—and pasturization is not economically sound for such small quantities of milk as would be produced by a single herd. There are two possibilities for solving this problem. The milk from a number of herds can be combined and processed as a cooperative operation, or arrangements can be made with a commercial cow dairy to handle the pasteurization. Goat dairy people, like most cow dairymen feel that the only way to produce healthful milk that has its natural vitamin and mineral content is to have a tested herd and maintain the sanitary conditions in the barn and in the milk handling at such high standards that the test bacteria count is around a thousand per cubic centimeter rather than in the tens or hundreds of thousands. Then the milk does not have to have the daylights boiled out of it in order to make it fit for human consumption. But city laws are set up to protect the public against the farm and dairy with the lowest sanitary standards, and usually they cannot be changed. Raw goat milk has remarkable properties of staying fresh and sweet. If it is chilled to 40 degrees in the first half hour after milking and kept refrigerated it normally will be sweet a week or ten days later.

The third problem with goats is the amount of time it takes to handle and milk them. Because of the time required to attach the cups of milking machines it is usually easier to milk by hand in a small herd. Large, commercial herds can make good use of milking machines. Each goat must be taken into the milk room, taken back, fed and watered in just about the same way as a cow—only a good cow produces five gallons of milk a day and the good goat gives a gallon. If the labor is supplied by the family this is no problem; if it must be hired, the cost of milk per quart skyrockets.

The distribution of goat milk to customers scattered over a city is an expensive business and the best way for a goat dairy to solve this problem is to make distribution arrangements with a cow dairy which has an established delivery route. Frozen goat milk, butter and cheese are fields that have not yet been tapped and some goat dairymen with a flair for innovation and merchandising will no doubt investigate this premium-price market in the near future.

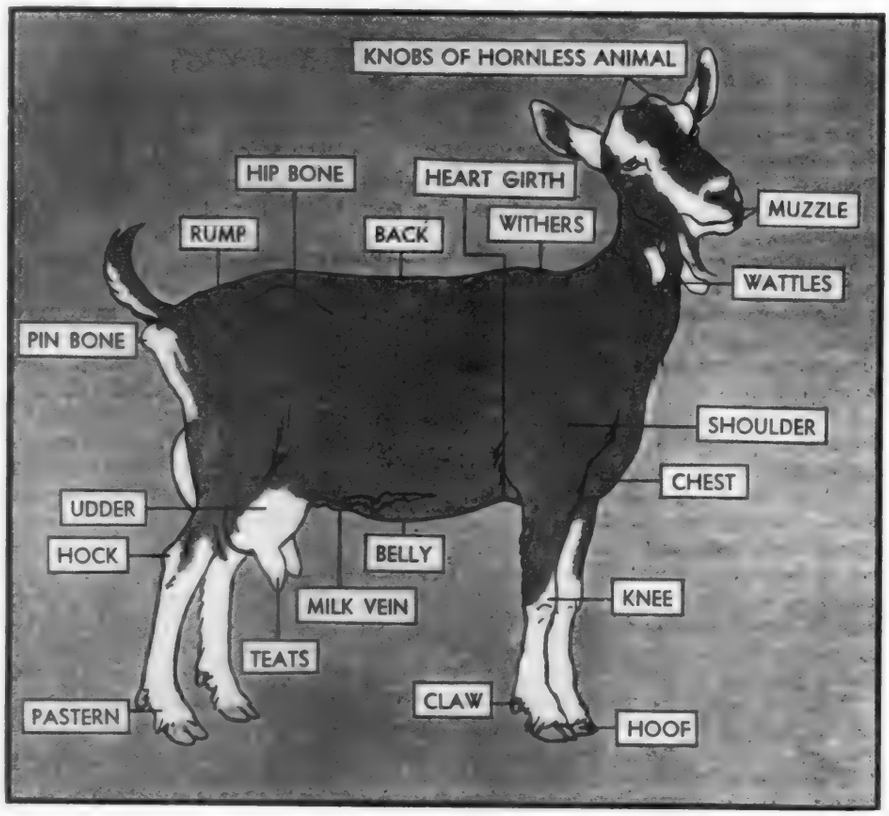
The Ozark Cheese-makers

The most impressive story of specializing in goats has come from the hills of the Ozarks. In 1942 the Bureau of Agricultural Economics of the USDA sent investigators into the region to get the facts. These are available in the report, "Mountain Farming in the Ozarks of Western Arkansas, with particular reference to goat dairying on low grade land".

Here in the area around Harrison, Arkansas on rough mountainous land selling for $1.50 to $5.00 an acre the farmers are finding a new and profitable cash income from goat milk. An acre of land supports a goat the year around with no other feed. A cheese-making cooperative was organized at Harrison which started off paying $4.05 per 100 pounds of 4% milk. There are now 84 producers supplying milk to the lant and the payment for milk is over $6.00 per hundred pounds. The demand for the cheeses in New York City and Chicago has so far been greater than the plant can supply. The kind of cheese that have been the specialties are Romano, Ricotta and Kefalotyi. This use of

(Continued on page 114)

POINTS OF THE TYPICAL MILK GOAT



THE PATRIARCHIAL BEARD and the supernatural gleam in the eye are not necessary props for the water witch, but they help convince doubters. This is the proper way to hold the twig. When the free end turns downward, there's water thereabouts.

WITCH WAY TO WATER

BY B. T. SANDEFUR

NUMBERS XX:2—And there was NO WATER for the congregation and they gathered themselves together against Moses and Aaron. :7 And the Lord spake unto Moses, saying, :8 Take the ROD, and gather thou the assembly together, and SPEAK ye to the ROCK before their eyes . . . :11 And Moses lifted his hand, and with his ROD he smote the rock twice; and the water came out abundantly . . .

OLDTIMERS in the Nebraska sandhills country south of Niobrara River still speak with awe of a gaunt Scotch-Irishman from Iowa who, though not a religious man, was a staunch disciple of the divining rod. "Old Moore," they remember, stood six feet six inches tall in his home-made socks, had hickory knots for muscles, and used his divining rod two ways—both successfully. One use for his pronged cherry twig was to detect underground water; the other was to aid his three sons in mastering the rudiments of propriety.

A neighbor chanced to be present one morning when Moore set out to locate water on the farm he had just purchased. Three bone-dry wells had already been sunk by former owners of the farm and the neighbors, long experienced in sandhill water problems, secretly felt sorry for the naive Iowan who believed he had only to wave a pronged stick over the parched earth to find water. One of Old Moore's sons, the runt of the family who measured six-feet-one, also thought it was nonsense and was indiscreet enough to say so.

For all his sixty-odd years and bristling white hair, Old Moore could move with the agility of an angry tomcat. In a twinkling he had the runt across his hip and the cherry rod was rolling dust out of his britches like smoke from a prairie fire. Old Moore then resumed his water-witching. Pausing at a spot a hundred paces from the barn, he drew a cross in the sand. "Here," he said, and walked away.

The three sons began to dig. Two days later the runt, plastered with mud, burst into the barn where Old Moore had swung his hammock between two cow stalls.

"We've hit it, dad!" the runt grasped. "We've struck water!"

The neighbors were amazed by the news but Old Moore, later known as the "Sand-

PROFESSIONAL DRILLERS seem to prefer the advice of a trained geologist when locating water. Subsurface water does not run in "veins" but is trapped in sand and gravel deposits. Where and how deep these deposits are the geologist knows.

hill Water-witch," serenely moistened his thumb and flipped the page of his mail-order catalogue. "Naturally, son," he said. "Naturally."

To Old Moore and those like him, a mysterious, unquestionable affinity exists between the forked stick and underground water. But to others who have been disappointed by professional water-witches, or for whom the twig stubbornly refuses to perform, water-divining is pure superstition.

It is true that the divining rod, which dates back far beyond Biblical times, has been used for everything from a lie-detector to a wart-remover. The magic powers attributed to it in ancient times were so many and varied that "priests of divination" were as thick in every community as real estate salesmen today. Cicero, familiar to but unloved by many a schoolboy, was no slouch as a soothsayer. Though he kept his work on a more dignified plane than most of his associates, he obviously knew the score. In his treatise on divination, Cicero needled his brother soothsayers with this remark: "I can't see how two augars [men who interpret the rod's omens] can meet on the street and look each other in the face without laughing!"

At first glance, this admission that divining rows were merely props used by soothsayers on gullible clients seems to support the skeptic's argument that the forked stick is a hand-me-down for the same purpose. A little deeper burrowing into history, however, turns up a clinker in this proof. At some time during the course of centuries the divining rod divided into two separate shapes. The original rod, a straight shaft such as Moses used in obtaining water from the rock, and with which Aaron first turned the rivers of Egypt into blood, then into seething masses of frogs, has come down to us today in the form of the magician's wand.

The water-witches' divining rod, or forked stick, originated in the Harz Mountains of Germany where it was first used by prospectors to detect ore veins and later by peasants to locate underground water. Unlike the straight wand, the forked stick has been given serious investigation by many scientists both here and abroad. In the bibliography of the United States Geological Survey Bulletin 416, "The Divining Rod—A History of Water Witching," Arthur Ellis lists 582 books and pamphlets published on the subject since 1532. Curiously enough, geologists and physicists have always been wonderfully nimble in dodging the prime question about forked-twig divination: "Is it is, or is it ain't, a hoax?" Perhaps the closest approach to a direct answer lies in O. E. Meinzer's introductory to Bulletin 416. Says Mr. Meinzer: "... It is difficult to see how for practical purposes the entire matter (water-divination) could be more thoroughly discredited ..."

Though they agree without qualification with this statement, twenty prominent university geologists recently answered FARM QUARTERLY'S query about water-divination in such a manner as to reveal three significant facts. First, none of the geologists claimed knowledge of the effectiveness of the forked-twig based upon personally conducted experiments. Second, more than half the geologists answered in the same vein as C. S. Gwynne of Iowa State College who said: "Although I place absolutely no stock in water-witching, I rarely try to dissuade others from their belief ... Many things are not beyond the realm of possibility." Third, the geologists who flatly denounced water-witching as a fraud almost invariably added this enigmatic tag to their statements: "Please don't quote me."

What lies behind this mysterious turtle-like reluctance on the part of most scientists to stick their necks out? Why do they discredit the forked-twig, yet gingerly duck authorship of the assertion that all water-witches are charlatans?

Why? Well, let's begin by reviewing how the water-witches operate, then have a look at the evidence both for and against their claims.

From the very beginning, methods of divining for water have been almost identical with those used in hunting for ore. Just as a prospector may use a different kind of twig for each metal, the water-witch may choose a hazel fork for one locality and a cherry, beech, holly, or willow twig for other localities. Some prospectors and water-witches use the same fork year after year; others insist that the best results are obtained when a fork is cut from a bush close to where the divining work is to take place. A minority of modern diviners use metal forks and a few dare-devils have tried plastics, they say with poor results.

After selecting the proper twig, the diviner grasps one fork of the branch in each fist with his fingers turned upward so that the free end of the rod is higher than the level of his hands. He then wanders about at random until the twig sud-

denly begins to twist downward. It is said that this movement begins the instant the diviner's feet touch a spot beneath which there is water or minerals. As soon as the spot has been passed, the twig once again becomes immobile.

Most diviners agree that the amount of twisting done by a twig is in direct proportion to the size of an underground vein and its nearness to the surface. In proof of this they call attention to the scarred condition of the bark where their hands have gripped the forks during a strong pull. When asked by skeptics why the twig does not perform as well for one man as for another, the believers explain that failure of a rod to writhe as though magnetized under the power of strong veins may be due to two things—either the operator is unskilled, or he may be possessed of impeding peculiarities which resist the forces of underground substances. This hidden quality, they add, has the same power of impeding the actions of a divining rod as has garlic for weakening and overcoming the strength of a magnet.

Unfortunately for the believers, their fascinating "magnet" argument is a dud. Says Stephen W. Smith of the Ohio State University physics department, "I know of no information which would even suggest that garlic tends to weaken the power of a magnet. All substances have minor magnetic, or diamagnetic properties, but the effect of garlic would probably be so small that it could only be detected by a very delicate instrument."

The "hidden qualities" referred to by the believers, however, are not so easily brushed aside. Many scientists reluctantly concede that the forked-twig *does* twist in the hands of a conscientious diviner without intention or voluntary deception on his part. Among the first to recognize and investigate this strange phenomena was King Louis XVI's royal physician, M. Thouvenel. As the subject for his experiments Thouvenel chose the most successful water-witch of the times, Barthelemy Bleton, a peasant of Dauphiné.

Barthelemy Bleton differed from other water-diviners in that he claimed no power for the forked-twig by virtue of its form or material. Instead, he regarded it as merely an index by which the involuntary tremors he experienced when in the vicinity of underground water might be seen by spectators. Thouvenel, after satisfying himself that the tremors were not faked, concluded that they originated in Bleton's diaphragm and were transmitted through his body and hands to the rod. In a series of insulation experiments, Thouvenel found that the tremors, though weakened when Bleton stood on a ladder or another person's shoulders, were destroyed only when Bleton was completely insulated from the ground by glass or other non-conductive substances.

In those days, as now, many forked-twig advocates staunchly believed that

MOST EARLY WELLS were dug and the walls lined with field stone. Depth was limited to fifty or sixty feet. Farmers were only mildly surprised when they found miscellaneous collections of dead rats, cats, and mice when they were cleaned.

WATER WITCHES enjoyed great prestige when wells like this were dug on pioneer farms.

A BELIEF in the therapeutic qualities of the waters from springs and wells is as old as civilization. It is still regarded as important, in some quarters, that a well have "healthy" water. This has little or nothing to do with its purity.

underground substances radiated electrical impulses which, when intercepted by gifted diviners, accounted for the tremors. Thouvenel's insulation experiments were accepted by them as absolute "proof" of their theories until another physician, Dr. Charles, pulled a fast one on Bleton. While the unsuspecting peasant stood on an insulated stool, his forked-twig inactive, the good doctor brought the top of the stool into contact with the ground by means of a conductor. When the divining rod remained inactive, though there was known to be underground water at this spot, a howl was raised that Bleton was a charlatan. It was years before Bleton was completely exonerated of this charge.

Numerous investigations have been based upon the hypotheses of mental-muscular reaction, the most laborious of which were performed by Sir William Barrett, a physicist in the Royal College of Science of Ireland. Sir Barrett, with the aid of Theodore Besterman, published his findings in two large volumes entitled "Water Divination" which are regarded as outstanding source material by most modern investigators.

Sir Barrett's experiments led him to conclude that the twisting of the forked-twig in a conscientious diviner's hands is purely psychic. This phenomena he ascribes to a "motor-automatism" on the part of the diviner—a reflex action stimulated by impressions subconsciously received. The divination instinct, he asserts, is like the homing instinct of a pigeon and lies below the diviner's conscious perception. The rod is merely a tool to record a material or mental disturbance within him which he could not otherwise interpret.

Many present day students of extra-sensory phenomena agree fundamentally, if not whole-heartedly, with Sir Barrett. Says J. B. Rhine of the Department of Psychology of Duke University: "Though the question of whether it (the divining-rod) moves better over water than elsewhere is one I can't answer on the basis of my own observations, I think the evidence is good for the view that the rod is turned by unconscious muscular activity. Such unconscious muscular activity is not at all difficult to demonstrate with the use of hypnosis . . . "

In spite of their other differences, scientists, skeptics, and diviners alike agree that mechanical take-offs on the divining rod are worthless. Among the mechanical gadgets used as diviners, the magnetic needle used in spotting a vein of iron ore is the only one that can locate underground substances scientifically. Other scientific instruments which have been developed to give useful information concerning the geological nature of hidden strata have nothing in common with divining rods. Moreover, no claim has been made that they do more than locate the *conditions* under which oil, minerals, and water are likely to exist.

In answer to all inquiries, the United States Geological Survey advises against the hiring of water or mineral diviners. This advice is in the nature of common sense because anything that can be veiled in mystery affords fertile hunting grounds for swindlers. That many of the professional water-witches and mineral-detectors who sell either their services or "radio-active" instruments are incompetents goes without saying. For example, a typical case involving professional water-witches occurred in Oxford, Ohio, where a new theater was being built. To make certain of an adequate water supply for their cooling system, the owners hired a water-witch who, after a few minutes workout with his divining rod, said, "You must dig here."

"Here" chanced to be in the exact center of the sidewalk in front of the theater, but the driller, who was being paid by the foot, went to work. When 160 feet of dense limestone had been drilled with no show of water, the owners became discouraged and hired a second water-witch in hopes of better results.

The second witch located a "vein" of water 40 feet north of the original site and the driller moved his rig to the new location. At a depth of 100 feet, however, he was asked to stop drilling. The owners were in a quandary, for the first water-witch had by now convinced them that he had been right all along, that the drilling should be continued at the original site. The next day the driller moved back to the first hole and resumed work—at so much a foot. He was much deeper in the dry limestone when the perspiring owners

(Continued on page 112)

PUMPKINS FOR PROFIT

(Continued from page 84)

though probably this variety would not exceed the weight yield per acre when evaluated with other varieties. Other varieties excellent for use as stock feed are Big Tom, or Connecticut Field, and Kentucky Field. Four pounds of seed will plant an acre when planted in hills, five to six feet apart in the row and the rows six to eight feet apart. Four to six seeds are planted to a hill; before plants begin to vine they should be thinned to two or three in a hill.

Pumpkins for Feed for Stock

Pumpkins are easily harvested usually at a time when most other harvesting chores are completed. In contrast to many farm crops, harvesting can be stretched over a fairly long period even after light frosts have appeared. There is no digging, as in the case of sugar beets and no reaping and threshing, as is necessary for grains; gathering is a simple matter of lifting the fruit from the ground, tossing it in a wagon, and hauling it to the barn. The pumpkins are easily stored in a sunny corner of the barn. They are rain-washed and clean and if care is taken not to snap off the stem attached to the fruit at time of picking, and only solid fruit free from abrasions or decay are selected, there should be little evidence of rot for several months. A light covering of straw, as temperatures go below freezing, will protect the fruit from freezing.

Preparing for Stock Feed

When fed to cattle, the fruit should be cut in half and the seeds scooped out and thrown away. A few seeds have a beneficial effect; a large quantity acts as a strong laxative and should be avoided. It should be cut into one to three inch cubes and a little bran may be sprinkled over the cut pieces as seasoning. The process of cutting up the fruit is satisfactorily and quickly done with a grass edging tool or a corn knife. Six to eight pounds for a small cow or eight to ten pounds for a large animal is sufficient for a feeding once or twice a day. This can be done at milking time. Pumpkins should supplement other feeds, not fed exclusively.

Food Value of the Pumpkin

The pumpkin contains seven to ten per cent carbohydrates, of which two or three per cent is sugar, one to six per cent protein, and two tenths to one per cent fat. The amount of fiber varies from one and one half to nine per cent. The caloric value is one hundred and sixty calories per pound, which is quite low. Minerals, essential for normal body development and functions, are found in the flesh of the pumpkin. These and in the quantity parts per million follow: Phosphorus 1500 ppm., Iron 43 ppm., Magnesium 11 ppm., Copper 10 ppm., Calcium .2 ppm.

Pumpkins grow best in light soil which is only slightly acid or neutral. Manure, 6 to 10 tons per acre, with 300-400 lbs. of super-phosphate and up to 1000 lbs. of 5-10-5 if no manure, is applied when pumpkins are grown exclusively. When grown with corn, the yield averages 5 to 6 tons per acre. Grown alone, the yield is from 7 to 15 tons. A pumpkin is 90% water and takes little from the soil.

Canneries like Stokely Bros. & Co., of Indianapolis, furnish the seed for farmers and pay them $7.00 to $11.00 per ton. Sold at retail for pies they bring 35 to 50 cents each. Seed costs range from 50 cents per pound for stock feed fruit to $1.35 per pound for the showy, big variety.

There are few farms where pumpkins are grown exclusively. Most growers plant a few acres, depending on how much help they can get, as a supplement to general farming. Tom Powell, of Newark, Ohio, plants about seven acres each year. He's a pumpkin enthusiast and says his cows give more milk on pumpkins and he has no trouble with worms. There's some hand cultivation, he admits, but says the pumpkins are worth it.

It seems logical that pumpkins, which can be grown with less labor and trouble than is expended on the average crop, and harvested and stored so easily, should be planted more extensively. Pumpkin pie fanciers and the family cow would be delighted.

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WITCH WAY TO WATER

(Continued from page 110)

finally reached a definite decision. They would shift their uncomfortable position to the patrons of the theater and let them sweat it out. The drilling was abandoned.

All this took place within two blocks of the home of a well-known geologist, Dr. William Shideler, who could have told them, had they asked, that water does not occur in "veins" as is commonly supposed, but that it fills the pore space in and between rocks. All rocks do not have the same type of pore space; at this particular point the only open sandstone which could provide an adequate supply of water lay from 1400 to 1500 feet below the surface.

In all fairness, however, this preponderance of evidence against professional water-witches proves nothing except that divining rods can be used by incompetent operators and/or crooks. On the other side of the ledger, more than balancing the records of swindlers, are men of unquestionable character who use the divining rod solely to benefit their fellow men.

In the dustbowl country of Kansas and Oklahoma a few years ago a country preacher—a little bantam of a man in a frayed black suit and a black string tie—took up the divining-rod to locate wells for his stricken parishioners. Reverend Gossley's methods were simple and straight to the point. Accompanied by his congregation in wagons and buggies he once turned in at a waterless farm and stood bareheaded for a moment, watching the swirling dust eddies move restlessly across the fields. Finally he raised his arms and delivered a short prayer.

"Father in Heaven, we're standin' on Hirum Caldwell's farm today and You can see for Yourself the fix Hirum's in. His well is dry and he's haulin' water twenty miles from the Santa Fe tanks to keep his family and stock alive. Hirum's a deservin' man, God, and with Your gracious help we're gonna' get him a well. If You'll just show us where to dig, Father, we'll 'tend to the rest. Amen."

The prayer finished, Rev. Gossley began trudging back and forth, his black tie flapping in the hot wind while his thin face became streaked with sweat and dust. In his gnarled fists was the divining rod; behind him trailed the silent, sober-faced farmers. Within the hour he had found a spot and the men started digging. They struck water at sundown.

On other occasions it was several hours before Reverend Gossley gave the command, and once the congregation followed him all one blistering afternoon and evening. Towards midnight he halted and prayed again, then took up the divi.....g rod and almost immediately gave the order to dig.

Whether it was Reverend Gossley's prayers, the divining rod—or both—that produced results, is a matter of opinion. There are many who will swear by the Gospel that he found water where dry wells had been dug before. Sometimes the water was close to an abandoned well, sometimes it was half a mile from the farmhouse. But if ever there was an instance in which Reverend Gossley failed to find water, no one seems to remember it.

Mountains of additional evidence might be collected, all of which would ultimately be typified by these excerpts from the letters of three prominent well drilling and water supply contractors:

Says Mr. Clyde Merrick of Layne-Northern Company, Mishawaka, Indiana: "We have had many experiences with water witches and in every case have found relatively dry wells in spots where they told us ground water was plentiful."

Says W. H. Boger of Columbus, Ohio, president of G. M. Baker and Son, water supply developers: "We have never employed a water-witch, but we have drilled wells at the request of customers after a spot has been witched. Our experiments in finding any quantity of water in such cases is about fifty-fifty."

Says F. G. Lucas, a cistern and well excavator of Covington, Kentucky: "Water can be located with a beech twig. I can—and have—proven this to be a fact."

. . . So here we have it, a cross-section of the pros and cons of water-divination. What does it all add up to? Who, in the last analysis, is right—the believers or the skeptics?

Frankly, no one knows. The deep-rooted credence in water-witching has never been dislodged, a fact emphasized in the British textbook "Geology for Engineers" by Brigadier-General R. F. Sorsbie, (1938). On page 145 of this book appears the following statement: ". . . when prospecting for water, the engineer will do well to call in the aid of a well-known water diviner . . . There can be no doubt, in spite of the prejudice against this fact, that from medieval times up to the present time, water divining or *dowsing* has been successfully used to find water."

Many investigators, including a group from Duke University, hope to probe still deeper into the extra-sensory aspects of divination. In the meantime, however, most members of the exact sciences will continue to look askance at water-witching, yet cagily refuse to label it pure charlatanism. Their reason? Well, to put it bluntly, the believers and the skeptics are at a stalemate. For while the believers, on one hand, can offer no conclusive scientific proof that the divining rod does locate water—scientists, on the other, are admittedly unable (page 25, U.S.G.S. Bulletin 416) to provide conclusive scientific proof that it does not.

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GOATS ARE NO JOKE

(Continued from page 106)

poor land that does not lend itself to cow dairies opens up new fields for goat raisers and makes productive land of hills that up to this time have raised only brush and pines. Certainly the farmers of this area think so for their cash incomes have been quadrupled.

Goat Shows

One of the ways a goat breeder's sporting instinct is satisfied is by taking his best kids and does to shows. One or two goats and a few kids travel contentedly in the back of the family car, just as dogs would. At shows, other goat enthusiasts are found, and among the hot dogs and pink lemonade, much useful information is gleaned and disseminated; many a new friend is made, while the blue ribbons are being decided upon. Shows run all the way from Sunday afternoon outdoor neighborhood kid shows, where the first prize is generally a bag of grain from the local grain dealer, to such shows as the First National Milk Goat Show held at the Illinois State Fair in August, where cash awards for goats were $1,365.00, along with ribbons, trophies and prizes.

How To Buy A Goat

The novice purchaser of a goat should visit the most reliable breeder in his locality and buy stock which the breeder recommends. The novice will do well to consider the breed of the nearest good buck available for service in making a choice of breed. He will also be guided by the availability of stock for sale and his personal taste.

In the hands of a competent breeder who understands nutrition, goats may safely be bred to freshen for the first time at 15 to 18 months of age. The novice will be wiser to wait until the goat is two years old before breeding.

The principal goat registry association is the American Milk Goat Record Association. The office is located in Sherborn, Massachusetts. This group has kept complete registry records of American goats for the past forty years. It supervises the Advanced Registry and Herd Improvement records of all goats on test under the official rules of the American Dairy Science Association and publishes the records monthly. The American Goat Society of Columbia, Missouri is a younger group which sponsors a milk scoring contest each year and maintains herd books. There are also state and sectional goat associations and clubs which sponsor goat shows at state and county fairs and are generally interested in the improvement of the animals.

FAYETTE FARM'S Nubian buck greets his filly friend, who is just back from the spring race meet at Churchill Downs, Kentucky.

The United States Department of Agriculture maintains an experimental herd of goats at Beltsville, Maryland and has an informative bulletin, No. 920 on Milk Goats, which may be obtained from the Superintendent of Documents, U. S. Government, Washington, D. C., for 5 cents. A good book on goats, although written 25 years ago, is "Modern Milk Goats", by Irmagarde Richards, published by J. B. Lippincott, Philadelphia, and available at most book dealers.

Many of the State Agricultural Colleges or Universities maintain experimental herds of goats and are well equipped to give goat breeders sound advice based on local conditions. Magazines about goats are: American Dairy Goat News, published at Richmond, Virginia; Better Goatkeeping, published by the Better Goatkeeping Institute, Ipswich, Massachusetts; The Dairy Goat Journal, of Columbia, Missouri; and The Goat World, of Portland, Oregon.

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YANKEE FARMER

(Continued from page 95)

ped as any in the village can't see why school authorities can't build as well one place as another. Farmers are actually advancing the supportable theory that schools should be in the healthy, quiet, country, and that underprivileged village boys and girls should be ferried out and back for their own good. This promises to be a controversy in the next period of years, and could show that farmers are civic minded beyond urban expectations.

A Vermont farmer can go to New York and explain the principle of building construction, but New Yorkers blink if you ask them to name four varieties of apples, potatoes, cows, or hens. Your Yankee farmer has opinions on UN matters as definitely as he does on the breed of sow he wants. The milk trains run into Boston at night, but they bring back morning papers the next day, and information is up-to-date. Country weekly papers are mainly for local matters and don't strive to compete with dailies that can be printed a hundred miles away and delivered on time. The local editors are esteemed, and call each week to find if the cow had twins, if the peas are ripe, or if Aunt Abigail flew back from Chicago. Rural life is intimate and personal, and Yankee country papers rely on local treatment. The editor speaks his piece, but has no particular authority or power. The community spirit in New England is dominating, and the weekly paper serves chiefly to gratify this spirit. Some papers went all through the war without mentioning it except in local terms. That doesn't mean nobody was interested—it means New England weekly papers have a special function. Most Yankee farmers take a city daily paper to read the news, and a weekly paper to confirm what they have already heard about over the party-line 'phone.

Rural New England is notoriously anti-New Deal. They oppose the present national government on principle, and expect sooner or later to hear people admit them right. It is hard for anyone not raised in the New England Town Meeting tradition to comprehend this attitude.

NEW ENGLAND TOWN MEETING

The Yankee runs his own government, not by deputy nor theoretically, but personally. From what he knows of government, the New Deal is no government at all, and should not have the support of anyone with true democracy in his blood. Nobody but another Yankee could possibly comprehend just what this distinction means. The Yankee would tell you, if anybody took the trouble to ask, that the United Nations won't work. Nice idea, he'd say, and too bad it can't be done. International diplomacy and the Brotherhood of Man make a nice snatch of song, but you don't erect a thing like that just by saying let's do it. The congregation of multitudes sounds like a good thing, but the Yankee knows that all civil values arise from the guarantee of personal things. You take something away from a man and he hates you. You give him something, and he joins

(Continued on page 116)

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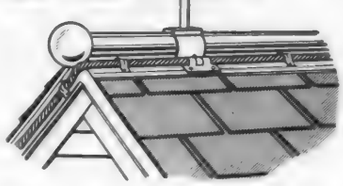

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(Continued from page 115)

right in. Town Meeting is where the Yankee farmer learned government, and he knows just how far you can go. It won't do any good to tell him he's wrong—he'll just tell you to wait and see. And perhaps that's as good an answer as any.

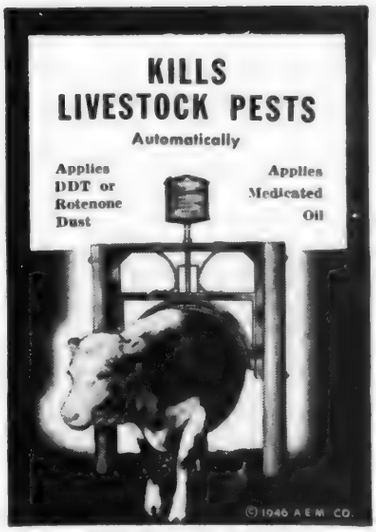
Longevity, too, is part of the Yankee theme. Nobody is too old to plan ahead. They say Vermonters never die, but cease only by act of God—as when a bolt of lightning leaves them standing upright in the hayfield. One man of 90 had been postmaster since he was 45, and Washington suggested he retire. He wrote back that he'd never have taken the job except he thought it was to be permanent. A woman of 76, when asked her occupation, said, "I take care of an old lady."

Something else that goes with being a Yankee is a certain inventive streak and skill with the hands. In Vermont and New Hampshire, where state departments have had a chance to collect activities, an amazing productivity has been observed. The people always made things, but you'd think this "arts and crafts" program was a revival to hear the publicity writers. Wood work, needlework, baskets, painting, pottery, and old-time spinning and weaving lead the list. Farm folks have found income from this. The old fellow who used to whittle now finds he is a woodcarver, and his work is sold from a shop in Rockefeller Center at prices which don't offend him any to speak of. The experts speak of this as "developing new interests," and sometimes even as therapy. The Yankee will let you call it anything you want so long as your check is good. Roadside stands that sell products of the farm have amazing stocks—baby rabbits, maple products, samplers, cherry-wood bowls, butternut candy, new green peas, hooked rugs, duck eggs, and even films developed with overnight service.

Some of the old things in New England are gone. Some will never die. There are new methods, new ideas, new equipment, and sometimes new people. But New England started back on Plymouth Rock, and that was a long time ago. You can teach an old dog new tricks, and can even unlearn some of the old ones. But you've still got an old dog. The puppy ways are gone out of New England, and the faithful, steady, settled manners of the Yankee farmer are a basic asset no other farmland of the country can claim. It has been said before that being a Yankee is more than geography—it's a state of mind.

Old Frank Lawrence is looking ahead, and he says, "Best of all, our young people aren't all going to the cities. These youngsters are putting Yankee farming back on its feet."

But young Carl Lawrence, wisely, is looking back, and he says, "We young folks have learned an awful lot from people like Dad. He hasn't been around here 80 years without knowing something."



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D. D. T.

(Continued from page 81)

crop after another will be something resembling the following: "Here is the best we can tell you now. From what tests we have made, and from what we have heard from other experimenters—State, Federal and commercial—we think you will be safe in using this many ounces or gallons of a certain DDT preparation with a certain type of equipment in treating a certain space for control of a certain insect or combination of insects. We think you will find it necessary to repeat treatment about so many times. We advise you strongly NOT to take chances and risk damage to crops or animals or to health of your animals or to buyers of your produce by using other dosages or other kinds of preparations this season."

This is not going to be altogether satisfactory advice. But it will be good advice—the best now available. For the next several years this kind of advice can be expected to improve yearly. For example, where the codling moth is the ruling pest of apples and where mites are unimportant DDT is likely to be advised for the cover sprays after bloom. But if mites build up under DDT, a new program will be less desirable and may not prove valuable unless or until a program of alternating sprays can be devised. DDT to take care of the moths for a while; then followed by a mite control; and then DDT again. But this is one of the many "maybe" situations.

There are a lot of "maybe" situations. DDT is good, for example, against the Japanese beetle. Maybe it will be good enough and cheap enough for very general use. Or maybe it will be too expensive for general use and still be worthwhile for publicly-financed pest fighters to use in wiping out spot infestations beyond the quarantine lines and far in advance of the general spread of the pest.

Tests against the Japanese beetle show that DDT is effective against the flying adult, and also when used in the soil against the grubs. A light application of 25 pounds of DDT to the acre kills these grubs about as effectively as the standard treatment of 1000 pounds to the acre of arsenate of lead.

DDT and The Busy Bee

Immediately following the introduction of DDT insecticides, bee keepers began to yell about what would happen to the busy little bee. At times the volume and clamor of critical comment, often based on guess or rumor rather than scientific observation, reached the proportions of a national issue.

In recent months the calm judgment of many competent observers has repudiated these fears. Herewith are presented excerpts from some of the recent comments, based on rather extensive preliminary

(Continued on page 118)

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D. D. T.

(Continued from page 117)

tests and observations. These are quoted from "Gleanings in Bee Culture".

"So far DDT is proving to be our friend and not our enemy. There is evidence that through the control of injurious insects the application of DDT before bloom, and this applies particularly to alfalfa, induces an unusually heavy bloom making this plant more attractive to honey bees than would be the case when plant-bugs and other insects are allowed to destroy millions of flower buds, making in many instances the production of seed essentially an impossibility.

"While the field application of DDT as a dust or spray does kill a few bees right along, we have yet to encounter a case of colonies killed or seriously damaged. In 150 acres of DDT treated cotton, where bees worked both floral and extra-floral nectaries, the colonies were much stronger in bees, honey, and brood at the termination of the experiment than they were when put into the field.

"That arsenicals are destructive to bees in many localities has been proved time and again. Not all applications of arsenical insecticides have proved destructive to bees. Thousands of acres have been treated with baits for the control of grasshoppers, yet late work seems to show that there is little evidence that this practice is detrimental to beekeeping."

The statements of James I. Hambleton, Head of U. S. Bee Culture Laboratory, Beltsville, Maryland, give an extremely optimistic turn to the future of bees if DDT is used generally. "A few large applications of DDT have been made in the past. This year the size and character of such applications are being stepped up materially; all, so far, on an experimental basis. As yet, however, our attention has not been called to a single case of serious injury to honey bees.

"Up to the moment I question, whether beekeepers are warranted in being so alarmed. There is no question, of course, about the effectiveness of this new insecticide, and there is no question but that it is here to stay. In spite of this there is

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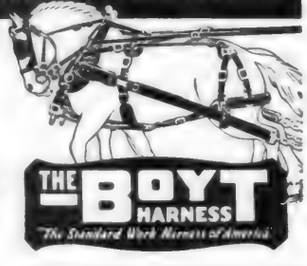

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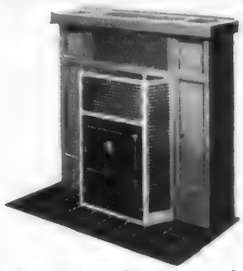

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some reason to feel a little optimistic. DDT has good lasting properties and for this reason could be applied early, before plants are in bloom, and an excessive number of applications, such as is true of the arsenicals, should not be necessary. Although DDT is not so toxic to the higher animals as are the arsenicals and some of the other commonly used insecticides, the Food and Drug Administration will nevertheless insist on a residue tolerance. Growers will have to be careful in its application. In dust form it does not appear particularly effective against honeybees.

"Entomologists are more awake to the pollination problem than ever before, and I doubt whether there is a single DDT experiment under way in which the research men are not at least conscious of pollination. Another reason for optimism —in the case of some honey plants, the destructive insects are so serious that plants can hardly be grown. DDT may, therefore, extend the range of certain plants, help to promote more vigorous growth and bloom, and if the material is not applied to the blossoms, beekeeping may profit. Altogether it seems to me that we have as much reason to be hopeful as we have to be pessimistic."

Birds, Fish and Folks

That DDT will have any serious or permanent effect on birds and fish seems to have been exploded by numerous tests. Dr. Annand, Federal Entomology Chief, points out that in tests last season DDT was applied in quantities five to ten times as heavy as would be used in practical control. The result was some destruction of smaller birds and fish, but the treated area did not become a "biological desert" and the wild life population was back to normal in a few weeks.

There is only slight indications that the insecticide is toxic to human beings. In its applications in the control of the typhus louse it was liberally sprayed into hair and clothing and remained in contact with the skin for long periods with no apparent damage. Workers in plants where the insecticide is being compounded have been subjected to DDT-laden air for long periods without apparent harm. Until tests are completed, however, etomologists are warning users against breathing concentrated suspensions. Certainly there is less danger than from our accepted arsenical dusts and solutions which we have been eating on fruits and vegetables and breathing in sprayed areas in varying amounts for a long time.

A Bit of History

DDT, popular symbol for dichlorodiphenyl-trichloroethane, the active ingredient in these amazing compositions, was synthesized in 1874 by a young German chemistry student, one Othmar Zeidler, in Strasbourg. His formula was a routine ac-

(Continued on page 120)

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These are Polled Shorthorns produced in the famous herd at

OAKWOOD STOCK FARM

where eight International grand champion sires have been bred and used. We invite you to attend our annual auction sale at the farm on November 11, 1946, when fifty head like those shown above will be sold. Visitors always welcome.

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Will be both a source of pleasure and profit to you. Write to us about them.
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Post-cards, Greeting Folders and Stationery, with picture of your own house, farm, garden, prize stock or other subject. Distinctly personal. Samples 10c credited on order. TIFFT, 121 Tifft Road, Dover, New Hampshire.

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Hatching eggs, Chicks & Breeding Stock. Eight-week-olds completely brooded. Write for Catalog & Prices.
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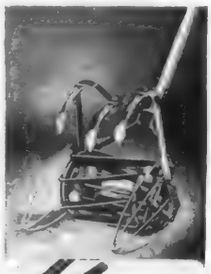
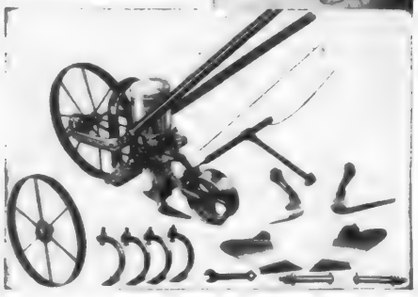
for Better Gardening

These rugged, sturdily-built farm and garden implements are designed to make your gardening more profitable and more pleasant. The combination seeder and cultivator (below) is actually 7 tools in 1, providing a variety of tools for most every light gardening need. Parts are quickly interchangeable, ready for the next job in a jiffy.

The Easy Garden Mulcher (right) is a 2-purpose tool that operates as easy as a lawn mower and produces a perfect dust mulch, kills tiny weeds, covers soil cracks and pores, maintains soil temperature for good growing, provides an insulating blanket that retains moisture.





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GOOD

FARM MANAGEMENT

CALLS FOR

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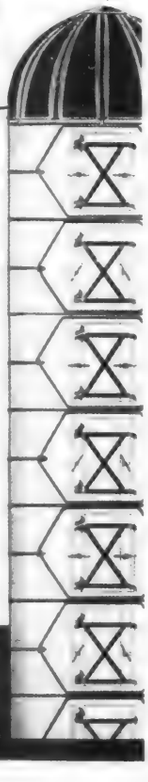

A Marietta Concrete Silo will pay for itself, and keep right on making money for you year after year. Built of pre-tested materials, and expertly engineered — they offer your feed crop all the protection needed against fire and storm. A Marietta Silo gives the most in silo investment returns — saves feeding time and labor. That's why a Marietta Silo is essential to good farm management.

THE MARIETTA CONCRETE CORP.

MARIETTA, OHIO

MARIETTA CONCRETE SILOS BUILD TO ENDURE

D.D.T.

(Continued from page 119)

complishment in connection with a paper he was preparing. He regarded it merely as a casual test tube evolution of no particular significance and recorded it in a brief six lines of notations in the Proceedings of the German Chemical Society. Zeidler had no idea of the insecticidal values inherent in the formula and his name, like the formula, has remained until now in obscurity. The DDT discovery eventually made by Geigy scientists was independent of Zeidler's work. Had his formula been generally known it might have been put into use long ago with the resultant saving of millions of lives and of untold wealth in agriculture.

It was several years ago that, in the testing of a number of formulae, Paul Muller, scientist of J. R. Geigy, of Basle, Switzerland, synthesized the product and discovered that an incredibly small amount of DDT, when combined with a carrier, provided an amazingly effective and durable insecticidal composition. In 1939, it saved the potato crop of Switzerland.

Until the army discovered its potent possibilities early in the war, DDT was little more than a successful formula and was produced only in small quantities in the laboratory. In 1942 Dr. Oskar Frey, of the Cincinati Chemical Works, voluntarily undertook the tough job of producing it in large quantities for the army. He and his chemists and production men, under forced draft, licked the problem and by mid-1943 the army was receiving ever-increasing amounts for its fight against disease and pests.

Shortages of the accepted insecticides, arsenates, pyrethrum and rotenone further encouraged the investigations which have revealed DDT compositions as the outstanding development in the insecticide field for many years. Many entomologists go so far as to say it is the all-time great in insecticidal development.

Dr. P. N. Annand, Chief of the Bureau of Entomology and Plant Quarantine, estimates that farm crop insects' destruction costs the agricultural industry of the United States two billion dollars a year. His predecessor, Dr. L. O. Howard, put it another way, that the devastation undoes the work of 1,000,000 men.

Meanwhile, it is not claimed for DDT that it is a cure-all. It is not. It is specific. It cannot be said that it will replace any one of the presently employed insecticides, nor are present DDT compositions eminently effective against all insects as is evident by the poor results so far indicated against the Mexican Bean Beetle, the Red Spider, the Cotton Boll Weevil and only fair results on some others.

The toxicity of Gesarol and Neocid preparations to men and animals is still under investigation by the U. S. Public Health Service, the Food and Drug Administration and the Kettering Laboratory of Applied Physiology of the University of Cincinnati, the last mentioned research being sponsored by Geigy. Research goes on. Indeed, considerable research is still necessary to determine all the possible uses and ineptitudes of DDT compositions. The forms and methods of application, the rates of application and the dosages on specific plants and in specific climates must be settled. Research is proceeding as rapidly as good practice permits.

Enough has been revealed to indicate the possibility of wide application in agriculture, households and in preventive measures against disease-carrying insects and to establish DDT compositions as among the great scientific discoveries of our time.

Many authorities have declared that out of this war have come three momentous discoveries in curative and preventive medicine—plasma, Penicillin, and DDT.

HOW TO USE DDT

USE	PRODUCT	STRENGTH	APPLICATIONS
CATTLEBARN	Neocid BA 50	Spray in 10 to 20 lbs. per 100 gallons of water	Once or twice during season
FRUIT ORCHARD	Gesarol AK 50	Spray 2 lbs. per 100 gallons of water	3-4 times season
HOME GARDENS AND SHRUBBERY	Gesarol VD 50	One or 2 lbs. to 100 gallons of water	Twice during season
CATTLE	Flies—Neocid BA 50 Lice—10% Powder*	Ten lbs. to 100 gallons of water	Once or twice each season
HOME USE	Flies, Mosquitos Crawling Insects Bedbugs, Moths Body Lice	5% DDT* in Solution 10% DDT Powder* 5% DDT in Solution* 10% Powder*	2-3 times season Once each season One application One application

*DDT in a 5% solution or 10% powder is sold under various trade names depending on the store and location. Many dealers use their own trade names. Neocid and Gesarol are original Geigy formulas. Variations and adaptations of these formulas are on the market under trade names of their respective manufacturers.

CAUTION: DDT preparations should be kept from food and feeds. It should be handled in the same way as other insecticides although it is not as dangerous as arsenical insecticides.

TWO GREAT TOOLS DESIGNED TO PUT MORE MONEY INTO FARMERS' POCKETS

30 years of agricultural engineering experience are responsible for the Super Flywheel Momentum of this Hammer Mill . . . and the 3-Way Action of its companion Corn Sheller

THE AMAZING HARVEY RED HED HAMMER MILL – through these many years of engineering development, now gives you a new low-cost way to make 4 bushels of farm grown feed do the work of 5 in meat, milk or egg production.

Three mile a minute speed of the Red Hed's big grinding cylinder makes possible performance you won't believe until you see it run. Yes, with the Red Hed you can grind grain, cob corn, bundle sorghum or roughage with a speed and smoothness that seems like magic.

80 to 280 feed-smashing 12-ton blows a second – that's what the Red Hed is built to deliver. Super Flywheel Momentum, actuated by smoothly running Timken bearings, gives the Red Hed the feed-shattering power that makes production one-third faster and cuts your feed-grinding costs.

An aluminum collector assembly – at no extra cost – rustproof, tough and non-sparking . . . another Harvey "first"! That's one of the plusses that Harvey – America's largest producer of hammer mills – is giving you on its great 1946 model.

AND HERE'S A NEW TRIPLE-ACTION CORN SHELLER – improved in design, construction and performance – a corn sheller that sets new high limits of capacity and money-earning ability for you. It's another Harvey Red Hed.

It works 3 ways to speed shelling at new low cost – The Harvey Red Hed is the only corn sheller with the patented open triple action KERNOLIZER that speeds shelling by doing three things at once.

The KERNOLIZER – the secret of greater capacity – does these three things at the same time: (1) it not only shells corn outside the unit – like ordinary corn shellers – but at the same time (2) it shells corn *inside* the unit, and while it is doing this double job (3) it is pushing cobs and husks toward the discharge. Hand husked or machine picked corn – they look alike to the Red Hed.

A screen pre-cleaner and a controlled air blast cleaner – 4-way feed hopper – adjustable cob outlet – new type corn thrower – corn discharge auger floating on sealed, dust-proof ball bearings are among many other features that contribute to the service, convenience and day-in-and-day-out reliability of this great Harvey Red Hed Corn Sheller.

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SEE THESE TWO GREAT "RED HEDS" AT YOUR LOCAL HARVEY DEALER

Examine each closely. Then judge for yourself what each offers you in low cost, long life feed grinding and shelling performance. OR – SEND THE COUPON BELOW for the great new book, "Secrets of Successful Feeding," plus complete specifications and description of the Harvey "Red Heds."

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FREE **. . . A great new book on feeding – to help you make feeding of farm-grown grains produce more meat, milk and eggs at less cost.**

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(Please check) Tell me how the Harvey Red Hed Hammer Mill ☐ Corn Sheller ☐ operate to help me prepare feed faster and more economically. I already own a hammer mill ☐. I already own a corn sheller ☐.

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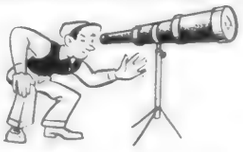

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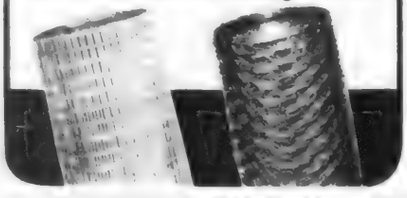

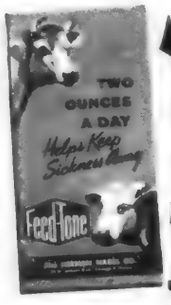

FREE Bulletin

"TWO OUNCES A DAY HELPS KEEP SICKNESS AWAY"

Tells WHY and HOW to use modern Trace Mineral, Bone Ash, and Vitamin D Tonic to help keep livestock healthy and productive.

SPECTACULAR RESULTS from Trace Mineral feeding—21% greater calf crop, more rapid rate of gain, better breeding bulls, relief of anemia in sheep, cattle and pigs, great improvement in health of sick dairy cows, are reported by State Experiment Stations who have fed one or more trace mineral carriers.

Feed-Tone

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The Herman Nagel Co.
53 W. Jackson Blvd., Chicago 4, Ill.
Rush me my FREE copy of your Bulletin—"2 Ounces A Day Helps Keep Sickness Away"—telling WHY and HOW Trace Mineral Feeding helps keep livestock healthy.
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Post Office.....State.....

FALL PASTURES

(Continued from page 82)

grass growth lightly and frequently to assist the legumes in becoming established. Patch seedlings succeed best on thin sods where the competition with grasses is not too severe.

Fall Grazing—While heavy applications of a high nitrogen top-dressing will build up the plant food reserves in the crowns and stimulate a marked increase in the production, it is nevertheless important not to over-graze after the cool weather arrives. A sufficient coverage should remain to hold the snow and enough top growth to permit building up supplies of nutrients in the root stalks to carry the plants through the winter.

Frozen Herbage—While cattle, particularly in the range land country, graze frozen herbage indiscriminately, it is a wise precaution especially with registered stock and high producing milk cows, which seem more susceptible to adverse conditions, not to turn the animals onto the pasture when the herbage is frozen. In the northern states early frosts or light freezes may occur at any time after Labor Day. Almost invariably these early frosts are followed by long periods of relatively high temperatures. This Indian Summer weather with its freedom from flies and its ample sunshine can be profitably utilized for late grazing. This materially reduces the cost of barn feeding.

Successful pasture management is a year around problem. There is no cheaper way to obtain the necessary digestible nutrients for the production of milk or meat products than a sound rotational grazing program. The intelligent grazing of fall pasturage converts the excess herbage into meat or milk, reduces the danger of legume stands smothering out during the winter and extends the grazing period at a time when general conditions are favorable for rapid utilization of the feed.

The dairy farmer or the livestock grower, who fertilizes his pastures in late August particularly those where the grasses predominate, is not only assured of a longer grazing season but also a marked increase in the protein, vitamins and mineral content of the herbage. Properly fertilized fall pasturage can produce herbage equivalent in terms of total digestible nutrients to high grade wheat bran.

Putting The Pasture "To Bed"—In northern areas, a kindly nature reduces the danger of erosion by freezing soils for several months. It is possible to get a part of the spring work out of the way by applying high grade complete fertilizers on pastures which are to be grazed early or by the application of normal superphosphate on the extensive pasture areas. If a couple of weeks elapse between the time that the fertilizer is applied and the time that the ground freezes up, the bulk of the plant foods will be absorbed by the plant roots. Usually the ground is firmer in the fall and there is less danger of the machinery cutting it up. Experiments prove conclusively that fall applications of fertilizer are equal to, and in many cases superior, to spring applications and pastures thus treated can be safely and profitably grazed from a week to ten days earlier. Applying the fertilizers in the fall gets ahead of the rush of spring work and gives the farmer a leg up on the multitude of demands when the sun finally gets around to shine on both sides of the fence.

Profits from FARMING

If you own or operate a farm, or if your business is in any way concerned with agriculture, profit from the expert advice of the oldest and largest farm management and appraisal service. Follow the lead of the

D.A.S. AGRICULTURAL DIGEST

A cumulative reference volume of 400 pages of vital statistical facts and information, in strong ring binder. Twice monthly releases keep it current—interpret trends and predict outlook on prices, production, markets, shortages, and surpluses ahead. Follow its recommendations and the service will pay for itself many times over. Thousands of farmers and business men profit through its use . . . The reference volume and twice monthly releases for 6 months, $15. Service thereafter, per year, $10

Write for Free Sample Releases

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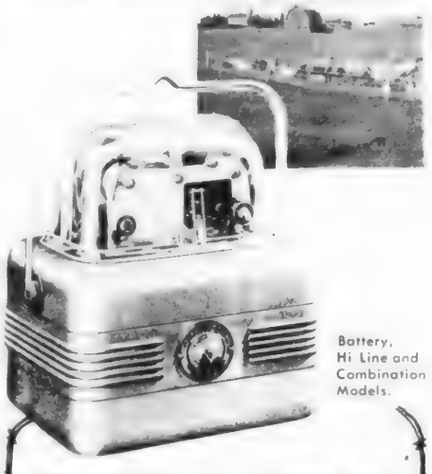
Box 241, 5579 Pershing Ave., St. Louis 12, Mo.

Electro-Line

FARM FENCE CONTROLLERS



Battery, Hi Line and Combination Models.

Effective *Electro-Line* ☆ controls your valuable livestock ☆ reduces fencing maintenance ☆ aids rotated grazing ☆ streamlines pasture management. . . . Dependable *Electro-Line* with ☆ visible operation ☆ powerful but safe intermittent shock ☆ new exclusive improvements ☆ precision construction does a better fencing job. Equip your farm today.

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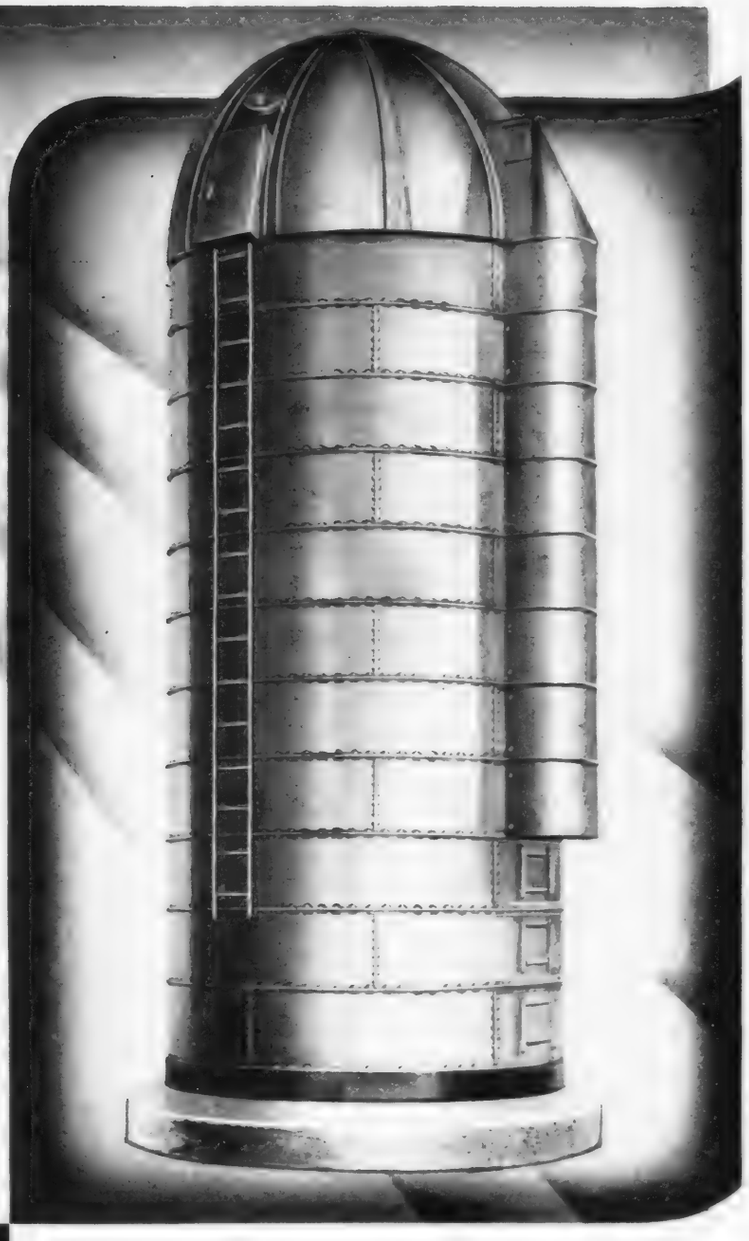
Erect a Time Tested

C&L

SILVER SHIELD—ALL STEEL

SILO

The C & L steel silo preserves all types of silage—corn . . . grass . . . legumes—perfectly without special equipment or extra labor. Made of heavy galvanized steel, they have rendered excellent service for more than 25 years, and are the choice of leading farmers today. They are permanent . . . add sales value to your farm . . . available in various sizes.



also C&L BUCKEYE CORN CRIBS

Made of heavy galvanized steel, substantially built for long service and convenient use, and engineered for proper ventilation. Buckeye Cribs are rat-proof, weather-proof, and excellent preservers of corn. The assembly is simple because all parts are carefully fabricated at the factory to match accurately.

Write for Descriptive Literature

CLAYTON & LAMBERT MFG. CO.

Sales Office: LOUISVILLE 10, KY. ♦ *Factory:* MIDDLETOWN, OHIO

How to Butcher and Cure a Hog

(Continued from page 70)

The Sweet Pickle Cure

Since the temperature of the curing room plays an important part in the success of this method, the recommendations are based on temperature conditions.

Temperatures of 32° to 48° F.:—Dissolve 8 pounds salt, 3 pounds cane or brown sugar or 1 quart of molasses of corn syrup, and 3 *ounces* of saltpeter in 5 gallons of hot water (water that has been sterilized by boiling is safest). This makes a 75° pickle when tested by a salometer and is sufficient to cure 100 pounds of pork. Measure the thickness of the hams, shoulders, and bacon and cure them 11 days for each inch of thickness.

Place the hams in the bottom of a clean barrel with the aitch bone up, shoulders next, and the bacon on top, with the last layer of bacon placed skin side up. Weight down the meat with a rock and pour the chilled pickle over the meat. Record on a card the dates on which the different cuts are to be taken out of cure and tack it on the curing vessel. Bacons measuring 2 inches in thickness come out of cure in 22 days, shoulders measuring 3½ inches through the center come out in 38 days, and hams measuring 5 inches through the center of the cushion come out in 55 days. This schedule should be adhered to closely for best results.

Temperatures of 40° to 50° F.:—Dissolve the 8-3-3 mixture in 4 gallons of hot water. This makes an 85° pickle which is considered strong and is better suited to higher temperatures. This amount will cover 100 pounds of tightly packed pork. The rate of cure is 9 days for each inch of thickness.

Errors in Sweet Pickle Method

Too many farmers unconsciously use guess work in making a pickle. They make up a pickle that will float a fresh egg or a sound potato but they fail to recognize the fact that a pickle that tests anywhere from 50° to 100° will float these objects. As a consequence, they secure various results, sometimes favorable, sometimes otherwise. Play safe by being certain—be certain by following a proved formula or by using a salometer, which can be obtained from a butchers supply house or hardware store.

If a low temperature room is not available, use the dry cure method. In case the curing pickle goes sour or gets ropy, remove the meat, scald the barrel, and make a new pickle. Sour pickle will cause sour hams. To secure uniform curing, the meat should be overhauled (removed and repacked) once or twice during the curing period.

Another fault is to under-cure or over-cure by allowing hams of various sizes to remain in the cure the same length of time.

Please
Vaccinate
Me- and be sure it's
ANCHOR SERUM
Vaccinate pigs yourself and be sure they get full dosage of fresh serum that has been produced and tested under strict U. S. Government Supervision.
"More Farmers vaccinate their pigs with ANCHOR SERUM than with any other Brand."
Send for free copy "VACCINATION SIMPLIFIED."
A complete line of veterinary supplies for the farmer including all the latest treatments for all livestock.
If there is no dealer near you, send your order directly to us.
VACCINATION SIMPLIFIED
ANCHOR SERUM CO.
1169 Kentucky Ave. Indianapolis 6, Ind.

The Dry Sugar Cure

Employ the same formula as recommended for the pickle cure but use cane sugar instead of brown sugar or the syrups. Weigh the cuts to be cured and use 1 ounce of the cure for each pound of pork. Hams require three rubbings at 5-day intervals; shoulders, which have a looser muscle structure, require two rubbings, and bacon one rubbing to absorb 1 ounce of cure per pound of meat.

Allow the meat to remain in cure 7 days for each inch of thickness (example: 2-inch bacon will cure in 14 days, a 3½-inch shoulder in 24 days, and a 5-inch ham in 35 days). The advantages of this method of curing pork lie in the fact that (1) the meat cures faster; (2) it will be successful at a wider range of temperature (from 33° F. to 65° F.); (3) no tight curing vessel is necessary since the cured meat is placed on a shelf, table, or box (meat must not rest in its own self-made pickle); (4) the meat will not be under- or over-cured because the exact amount of cure has been added, no more, no less; and (5) the curing period is very flexible because the meat can be washed (needs no soaking) or brushed and placed in smoke at any time after the meat is cured.

Soaking Cured Meat

Meat that is dry sugar cured as recommended need not be soaked. Sweet pickle cured meat should be soaked in cold water for several hours to remove some of the salt on the surface of the cuts to avoid the development of salt streaks caused by the heat of the smokehouse.

Smoking Cured Meats

Do not start the smoking until the meat is dry, and suspend the cuts so they do not touch one another. Wire hangers are preferable to string for supporting the different cuts. Net ham bags are best for hams and shoulders. The wood to use should be a species in no way related to

Plant PERMANENT *Gardens*

Flowers and fruit grow on permanent plants just as beautifully as in laborsome annual gardens. They become an increasingly valuable permanent investment instead of a mere yearly expense.

Flowers WITHOUT *Drudgery!*

Giant Dutch CROCUS last in ground for decades. Rainbow mixture, 9 centimeter bulbs (largest grown) 25 for $1.50

NARCISSUS and DAFFODILS. Permanent Naturalizing mixture, all kinds. Largest size round bulbs, 100 for $8.00.

3 Highest Rated PEONIES. Plant once for 25 years labor-free beauty! LeCygne (best white); Rivoire (best red); Therese (best pink). One each, all 3 for $8.00. All outstanding, far beyond ordinary.

BROWNELL ROSES. New sub-zero hardy race. Larger and showier each year. We offer 14 kinds, including the best Hybrid Teas, Climbers, Creepers. Any 3 for $5.00.

Beauty WITHOUT *Back-ache!*

Plant 'em once, beauty for generations and even without cultivation—RHODODENDRONS for as low as 35c.

Young plants, 12 to 15 in. high, with small earth ball. (You pay express on arrival — about 6c ea.).

Price ea	5-24	25-49	50 up
RHOD. MAXIMUM—White. July	60c	40c	35c
RHOD. CATAWBIENSE—Purple June	75c	60c	55c
RHOD. CAROLINA—Clear pink May	75c	60c	55c
KALMIA (Mt. Laurel)—Pink—white. May	60c	45c	40c

OFFER A: 5 each of above, 20 evergreens, for $13.50.

OFFER B: Larger, 4 years older, 1½-2 ft. B. & B., bushy specimens. One each above, plus Leucothoe (White; April—5 fine evergreens, boxed for $15.75

Successful FALL PLANTING

It is different from Spring planting. Our 1946 Fall Price-List gives simple rules that explain how and when to plant what.

Copy free (except 25c West of Iowa). Or order from this ad:

Bearded Iris (July-October). We offer 1 each of ten of the best newer kinds. Twice as large as old-fashioned kinds, bright colors. All 10 for $4.25.

Tulips (October-December). Larger bulbs mean larger blooms. We offer 11-12 centimeter Dutch bulbs, rainbow mixture, modern kinds:

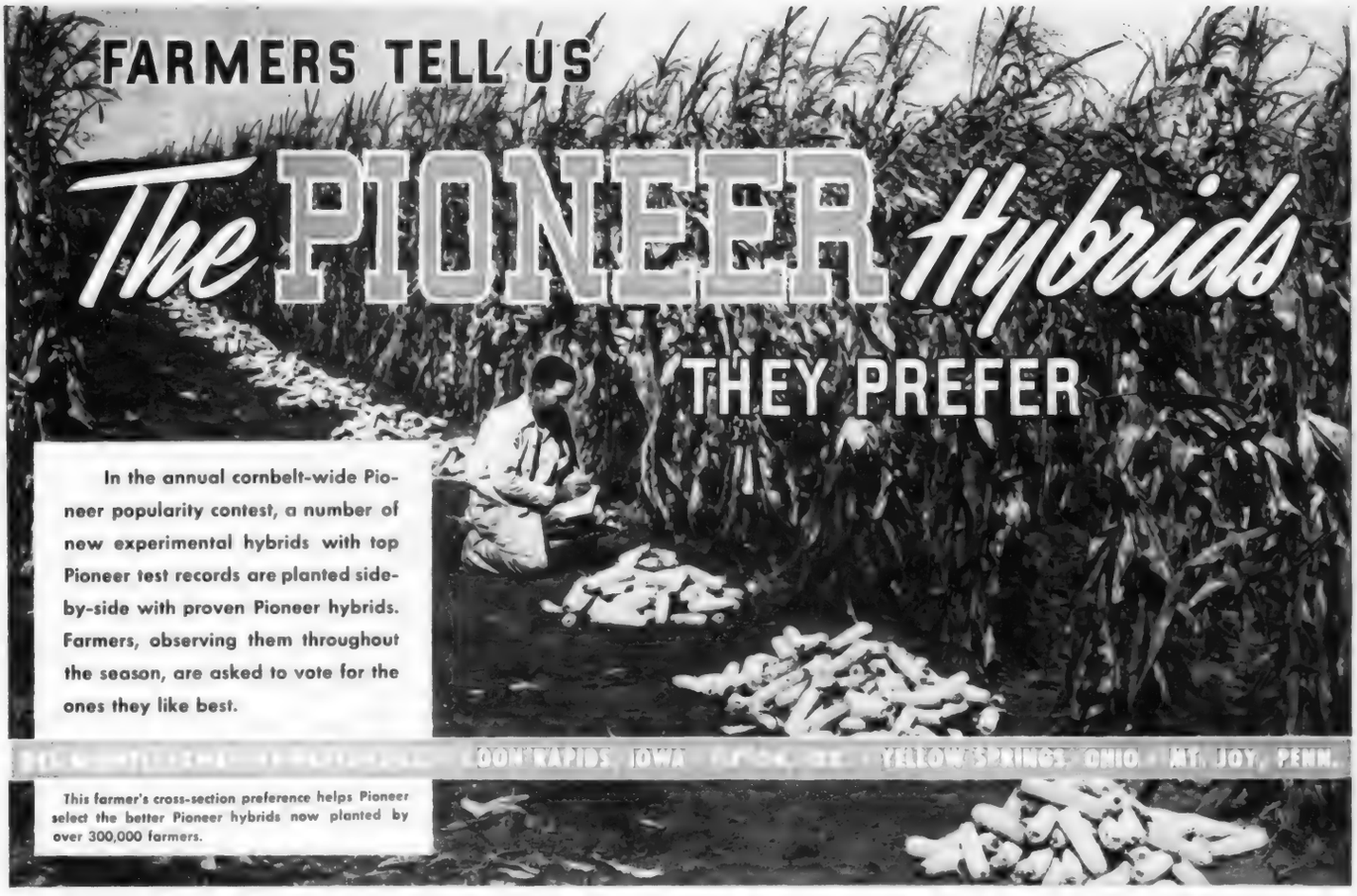
DARWIN TULIPS, mixed, 100 for $7.50.

COTTAGE TULIPS, mixed, 100 for $7.50.

Larger the bulbs, the larger the flower.

KELSEY NURSERY SERVICE

Dept. 3F, 50 Church St., New York 7, N. Y.


FARMERS TELL US
The PIONEER Hybrids
THEY PREFER
In the annual cornbelt-wide Pioneer popularity contest, a number of new experimental hybrids with top Pioneer test records are planted side-by-side with proven Pioneer hybrids. Farmers, observing them throughout the season, are asked to vote for the ones they like best.
This farmer's cross-section preference helps Pioneer select the better Pioneer hybrids now planted by over 300,000 farmers.

the pine or resinous woods. Hickory is the most popular but apple, maple, beech, or oak gives very satisfactory results. Dry corn cobs are excellent for starting a fire and, when dampened to make them smoulder, can be used for the entire smoking process.

The smokehouse should be fireproof, and a good size for farm use is 6′ x 6′ x 8′. The fire box should be built on the outside of the house, with a smoke vent to conduct the smoke into the house.

It requires about 24 hours to smoke meat to a chestnut brown color in one continuous smoking period with a smokehouse temperature of 100° to 120° F. The higher the temperature, the more rapidly the meat takes on smoke and the shorter the smoking period. The use of liquid smoke and smoked salt in the curing of meats to be sold to the trade is forbidden by law in some states.

Virginia Ham (Smithfield)

Sprinkle the flesh surface of the ham with finely pulverized saltpeter, using from 4 to 6 ounces per 100 pounds of green ham. Immediately following this application of saltpeter, give them a rubbing with a liberal amount of fine table or flake salt and stack them in bulk, skin side down, in a cool place. Do not allow them to rest in the juice or brine coming from the ham. Allow three or four days to elapse and then give them another good rubbing of salt and let them cure one day for each pound of ham.

At the end of this curing period, wash the hams and when partially dry, give them a rubbing with black pepper. Place them in a smokehouse and smoke intermittently for about a month and then repepper them, place them in sacks and allow them to age for 10 to 12 months.

Virginia Ham (Old Time)

The hams are given one long thorough rubbing of salt, the hock end is packed with salt, and an extra layer is spread over each ham as it is packed into a barrel and left to cure for seven weeks. The lid of the barrel should be set on 2″ x 4″'s or bricks placed in the bottom of the barrel to keep the hams out of the concentrated brine that comes from the ham. Oldtimers say that this must be done when the moon points down or the cure won't take. Moon up or moon down, at the end of seven weeks the hams are rubbed with a mixture made up of ½ pound black pepper, 1 quart of molasses, 1 pound brown sugar, 1 ounce of saltpeter, and 1 ounce of red pepper and allowed to cure another two weeks. Put them in stockinettes and hang them in the meat house, with the hocks hanging down, where they should age from 30 days to eight months.

In other words, hang them "not for days, not for years," but—until they are eaten.

Curing Frozen Pork

The growing number of freezer locker plants make it possible to slaughter in warm weather, place the cuts in freeze, and cure them during the winter. Pork that is to be cured should not remain in freezer storage at 0° F. longer than four months. If it is to be dry cured, it must be thawed but if it is to be pickle cured, place the pickle over the frozen meat and let it thaw in the pickle.

The curing period can be cut down two days from the regular curing schedule for each inch of thickness because frozen meat absorbs salt more readily.

Holding Cured Meats

Have a well-screened (fine-mesh), well-ventilated, dry, cool room or pantry in which the unwrapped meat can be suspended without touching anything but the hanger that holds it. Mold will not develop on a dry surface but wherever a wrapping or anything touches meat, moisture will collect and mold will grow. Placing the meat in a tight sack and burying it in an oats bin, packing it in salt, covering it with yellow wash, or all the other methods one hears about cannot compete with the above method.

A method preventing mold altogether is to rub the meat well with Sodium or Potassium Propionate and then wrap it.

If this lesson on the butchering and curing of a hog is mixed with a good dose of common sense there's no reason why you can't go to the smokehouse next winter, cut yourself a thick slice of fragrant, spicy, tender ham, slap into a hot skillet with a half dozen golden yolked eggs, and sit down to as delightful a dish as ever tickled the palate of man.

"Howdy . . . I'm Ready to Work for You"

"Just call me Miller Amp 27. . .

That's right—Amp 27. Sure I'm proud of my name, 'cause you won't find Amp 27 on many farm welders. The big reason is that most farm welders are the plug type with 10-25 amperes between the sockets. This means the amperes between the sockets are lost . . . they can't be used . . . 'cause there is no outlet for them."

Now, with the Miller Farm Welder and its new "Swing-Lock" amperage selector you can get every amp. There are no missing amperes on the Miller. In fact, there are no amperage plugs, taps or sockets to change, no cranks to turn to get heat settings. Simply swing the knob to the desired amperage and release, it will lock itself.

It's easy to meet Amp 27 and all the Miller Amps. Just stop at your dealer's store today . . . try the welder with the right amperage for the job.

Miller Farm Welders
MILLER ELECTRIC MANUFACTURING COMPANY
RICHMOND, INDIANA

THE FARM FLOCK

(Continued from page 21)

would disclose quite a series, the newer ones being more effective than earlier suggestions. None have proven 100% effective against all of the different kinds of worms. The newest material, by far the most effective found thus far, is phenothiazine. Sheep have a much greater tolerance for this chemical than for the older treatments and it is much more efficient. While a bit more expensive, it is safer and much easier to use. Here is the best current recommendation:

Dose with phenothiazine in the fall at the close of the pasture season.

Dose with phenothiazine in the spring before turning on pastures to be used by the flock. Make a mixture of 1 pound of phenothiazine and 9 or 10 pounds of salt, the sole source of salt throughout the grazing season. Feed the mixture in a trough protected from sun and rains.

The dose is one-eighteenth of a pound for sheep and lambs over 60 to 65 pounds. Smaller lambs require a half-dose. It is given to rid the animals of worms. The fall dose eliminates most of the worms that were picked up during the summer. The spring dose is sort of a double check for getting out lingering worms that would otherwise produce the eggs which in turn would contaminate the pasture. The salt mixture provides a daily intake of a very small amount of phenothiazine which seems to prevent the hatching of living larvae. The salt mixture does not get enough of the drug into the animals at any time to kill adult worms. Phenothiazine has given many farm flocks a new lease on life and a visit to the stock yards during August would support this statement. Fewer lambs appear showing pale white skins and diarrhea, the tell-tale symptoms of worms.

Boston is the principle wool market of the United States and more than two-thirds of the lambs produced in the nation are consumed east of Buffalo and Pittsburgh and north of Baltimore. On the other hand two-thirds of the lambs and wool in our domestic supply come from the west and Texas. Mid-west farmers are well situated for marketing wool and lambs. Typical of other farm products, both lambs and wool bring higher returns when sold on a graded basis. Grading further facilitates sales since few lambs and very little wool are consumed nearby.

Farmers who raise sheep should have knowledge and understanding of market grades for lambs and wool. It is not difficult to tell the age of breeding sheep by the teeth. The lower jaw of lambs bears 8 baby or "milk" teeth. The yearling mouth carries one pair of larger permanent teeth. Two-year-olds have 4, at three years there are 6 and sheep become "full-mouthed" at four years old. Older sheep are considered "sound mouthed" as long as the eight incisors are present and in good condition and become so-called "broken mouthed" when a part of a tooth or one or more teeth are missing.

Market Weights of Lambs

The market grades for lamb are based upon finish or fleshing, weight, quality, and condition. Weight in the better grades changes some during the season. A 65 pound lamb can be "choice" early in the season. During this period the market run is light and the small number offered in markets like Cincinnati or Cleveland may be absorbed through the local retail outlets. The fleece probably accounts for much of the confusion in farmers' thinking, for a lamb may look fat and be lacking in finish. Graders, salesmen and buyers use their hands to determine the finish. Of all meat animals produced on the farm, none are penalized in price so much as lambs for being under finished. There is a reason for this situation. Lamb carcasses are small. The actual weight of the skeleton or the bones in a 40 pound choice carcass is very little if any greater than the weight of bones in a 33 or 34 pound medium carcass. The difference in weight is therefore edible meat and a little fat. If we go into a cooler and look at two beef, pork or veal carcasses, one weighing within 6 or 7 pounds of the other there may be wagering on which is which, but on the small lamb carcass the same weight difference represents 16% or 17%.

Wool grades are based upon the diameter of the individual fibers which varies between breeds, and regions of the body upon which it grows. The ewes of most of the mid-west farm flocks where meat type rams have been in service grow fleeces that are classed as medium wool. Although wool produced over the shoulders, sides and back is finer than breech, belly, and leg wool, the entire fleece is tied together with paper twine, classified according to the characteristics of the major part of it or "main sort" and sold as such. Farm flock wools are termed "fleece wools" in the trade. There are seven major grades plus many more sub grades having to do with length of staple and many other factors. While the busy farmer has not the time to become a wool expert, he should carry in mind fleece weight and endeavor to grow fleeces with enough staple to be classed as combing wool for which the price is higher than for the shorter or clothing wools. He can take advantage of higher prices that are paid for carefully graded products by selling on consignment through reliable firms. Throughout the middle west there are both co-operative and independent houses that provide licensed grading and selling service.

Profit Outlook Good For Sheep

Prospective profits exist for good producing flocks. When ewes produce an average of 100 pounds or more of market

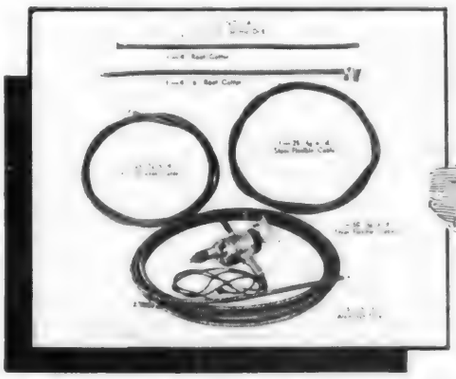
(Continued on page 128)

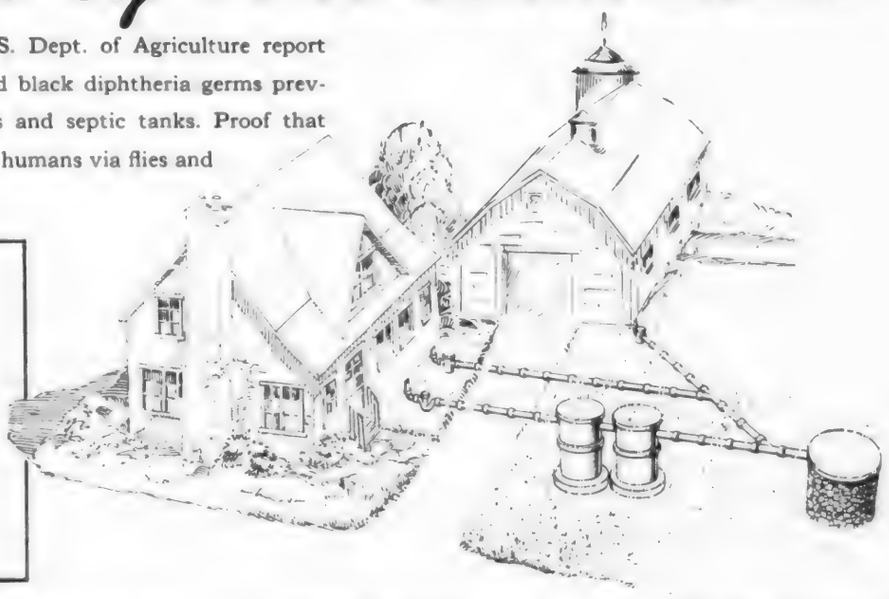
TROUBLE?

CLOGGED CESSPOOLS, DRAINS AND FAULTY SEPTIC TANKS

Corrected by MODERN SANITARY METHODS

Medical science and the U. S. Dept. of Agriculture report evidence of polio, typhoid and black diphtheria germs prevalent in overflowing cesspools and septic tanks. Proof that such germs are transmitted to humans via flies and other insects is on record.





Underground clogged pipes can now be cleaned easily by the use of our #1A Electric Sewer Cleaning Cables. Constructed with a special twist enabling the operator to make cable crawl into any drain pipe, trough or sewer line by simply revolving it. Twisting motion can be effected by use of Stillson wrenches or ½" electric drill.

The set is comprised of 100' of cable, including two 25' lengths and one 50' length, each equipped with male and female couplings, two knives and a drill adapter to fit your drill.

No need to be inconvenienced by sluggish sink drains, water-closet lines, barn area and trough drains, etc. These cables will go around quarter bends, traps, etc. Every home and barn should be equipped with this set. Price, $87.50 less drill.

PEPS-IT — revitalizes and increases the efficiency of your septic tanks and cesspools. The cause of clogging in most septic tanks and cesspools is the slowdown of bacterial action. This slowdown, in addition to filling the tank, clogs the surrounding ground thus preventing seepage and drainage. PEPS-IT will speed up bacterial action of "in use" tanks and start such action in new tanks. Can be supplied by pouring package of PEPS-IT into water-closet. One package about every four months will keep septic tanks and cesspools working at full capacity, thus providing continuous "inside" plumbing facilities. Save pumping expense, for clogged septic tanks and cesspools use PEPS-IT. Price $2.50 per package.

SURSOLVENT is a crystal form of chemical which when applied to the liquids of a cesspool or septic tank will liquefy the solids in the cesspool, and also the lodged particles of organic matter in and about the surrounding subsoil. It is these lodged particles of organic matter which make the cesspool watertight, causing chronic overflowing. Easy to apply! *Simply remove top of cesspool and dump chemicals in . . . may also be applied through laundry or kitchen sink drain. Price $15.95 per 100-lb. barrel. F.O.B.*

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294 LINCOLN ST.
ALLSTON (BOSTON) 34, MASS.

ELECTRIC SEWER CLEANING CO.
294 LINCOLN STREET ALLSTON 34, MASS.

Please send immediately the following items:

- ☐ *Set #1A, Electric Sewer Cleaning Cables — $87.50 ea.*
- ☐ *100 lb. barrels of SURSOLVENT, $15.95 per barrel.*
- ☐ *Packages of PEPS-IT, $2.50 ea.*

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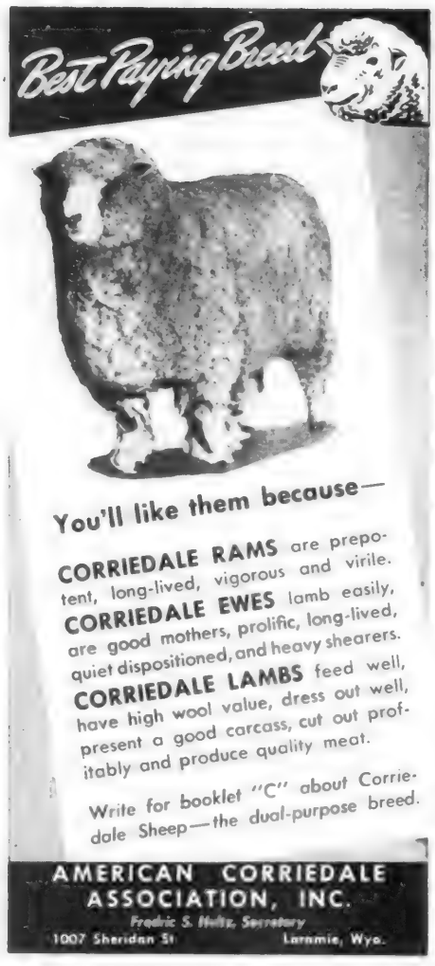
Enclosed is __ Check __ Money Order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CORRIEDALE RAMS are prepotent, long-lived, vigorous and virile.
CORRIEDALE EWES lamb easily, are good mothers, prolific, long-lived, quiet dispositioned, and heavy shearers.
CORRIEDALE LAMBS feed well, have high wool value, dress out well, present a good carcass, cut out profitably and produce quality meat.
Write for booklet "C" about Corriedale Sheep—the dual-purpose breed.
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Offer 40 head of Registered Corriedale ewes open or bred for fall delivery. No better breed than the Corriedale. No better ewes will be offered than these.

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Registered corriedales from the famous Polo Ranch breeding.

Visit our Farms and select your breeding stock. We carry a flock of over 500 head, no better blood lines in the United States. Rams and ewes for sale at all times.

H. E. McBride and Frank Swensen
HARPSTER, OHIO

GRASSLANDS

Home of pioneer flock of Registered Corriedale sheep in Indiana. In our breeding, we stress size and quality. Rams and ewes for sale.

Dr. C. J. STOVER, R. No. 1, Muncie, Indiana

THE FARM FLOCK

(Continued from page 126)

lambs and eight pounds of wool per year, they can net at present $5.00 to $5.50 or more per year. This estimate is based upon reasonably good production for average aged ewes valued at $10.00 each. It takes into account such items as interest, taxes, feed pasture, labor (at 50c per hour) shearing and veterinary service as well as normal death losses. Considering the size of the investment and possible profit, sheep look good enough. In November 1945, the writer helped load some 115 pound lambs in a car that returned their producer $21.50 each after all marketing costs were deducted. This weight and return reflects the subsidy for heavy lambs aimed at helping the meat shortage situation. Into the very next car some skip lambs were driven that were no more than a nuisance to some farmer. In the same shipment went some productive ewes that did not get a single bid after spending all day in the yards.

A good product is the result of a job well done. The keeper of just a few sheep has a difficult job in turning in a profit. The unit is too small to justify an investment in a good ram and the fundamental practices may be neglected. The one ram flock would seem to be a practical minimum. This means 25 to 35 ewes; many owners of eight or a dozen might find room for these additional sheep without crowding.

If it is true that a very few sheep keep a farm clean, perhaps a few more would keep it as clean or cleaner. The weed controlling ability of sheep should be discounted to some extent. Wool handlers find more rejection fleeces that are seedy and burry in consignments originating in sections where small flocks are the rule. One dealer could actually name the community from which some clips he handled were shipped by the particular type of burrs carried in the fleeces. Owners of sheep severely infested with burrs claim that their flocks harvested the seeds. Surely after nearly a century of "cleaning up the burrs" the wool should be coming in clear, but this is not the case.

Good Fencing Is Starting Point

The farmer who knows he will not find time to keep his flock healthy, to control parasites and who thinks he cannot spare good hay for brood ewes, will profit by devoting all his efforts to other stock. Adequate fencing is a must. One wire electric fence may keep the sheep in but it won't keep the dogs out. Pastures for sheep should have a good mesh fence. In many sections, fence and building upkeep show the mark of war time labor shortages. Farms located near cities, mill and mine towns especially are overrun by stray dogs. All states have dog laws. In so far as the statutes are concerned they seem to be adequate, but there are people who will refuse to give dogs the care they deserve and there are public officials who lack the courage to fully discharge the duties of their offices. When the farmers of a community are sincerely interested in solving a problem, they usually get something done. We can see an example in Kentucky. County mutual dog insurance societies were formed in a number of counties when approved sheep claims were filed unpaid for years because of a lack of funds. After several years the original annual premiums based on approved claims of record yielded a surplus. Later the renewals were made for as little as a penny or two per sheep becauses losses were reduced. The community became dog minded. Dogs in these counties are fed and cared for properly.

Now that the majority of our population is composed of consumers, rather than producers of food, we have three votes for lower priced food to one for higher prices. Better mechanical equipment will probably speed rather than retard the trend. Livestock that requires a minimum amount of labor has a place in this picture especially as farm production per man is stepped up. The outlook for lamb is good for the per capita consumption at the present time is only six or eight pounds. Merchandising trials conducted before the war indicate that it can be raised, and a fractional pound increase would have a marked influence on lamb prices. Wool on the other hand does not have a bright outlook. Our nation in peace time uses much more wool than we produce. Carpet wools come in duty free, but the tariff on raw wool is 34c per clean pound. This amounts to from 14c to 19c per grease pound and at the present time foreign wools are being delivered to our manufacturers at a few cents per pound below domestic wool values. Preparation gives much of the foreign wool an added advantage. On top of this situation there are the synthetic textile fibers. Following World War I, rayon meant pink panties in the dime store window. Now it has been delustered and spun and used in blends with wool. More recently synthetic protein fibers have past their laboratory stage and are now in production offering a closer kind of competition for wool. Brewer's yeast is now being treated chemically and spun into a fine imitation cashmir wool.

So long as we have sheep on the farm, we may never hear the last supper call of the sheep shearers, but we will be placing more and more emphasis on the lamb crop.

PROTECT YOUR HOME AND FARM from FIRE
Don't let FIRE catch you unprepared. Protect your property with INDIAN FIRE PUMPS! Ideal for forest, grass and grain field fires. Also excellent for spraying all crops, disinfectants and whitewash. Low - priced. Literature FREE.
ONLY CLEAR WATER USED
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Swift's Mineral Supplement
Supplies essential minerals to all livestock and poultry rations. Stimulates increased production of meat milk and eggs. Feed from self-feeder or in mixed feeds.
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Across the nation, from Tampa to Tacoma, livestock production lines are turning out meat for a hungry world. On the high ranges and the plains, in the feed lots and the farrowing pens, it's *good feeding* that makes an efficient operation. *All along the line,* Swift's Mineral Supplement provides the mineral balance that speeds production of healthier, better-paying livestock.

For vigor in breeding stock, fast gains in feeders, and disease-resistance in all your livestock—*look to Swift's Mineral Supplement.* It supplies minerals often lacking in grains and grasses, promotes full use of the protein in every precious pound of feed. No matter what type of livestock you raise, Swift's Mineral makes more profitable feeding because it helps you to cheaper, quicker gains.

It's the policy of Swift & Company to sell quality products, fairly priced. In selling mineral, we have a deeper interest than making a quick profit... we want to purchase from you the high-quality livestock that Swift's Mineral Supplement helps produce.

Swift's Mineral Supplement is a smart and thrifty buy at any time — but especially *now.* Order from your feed dealer today, or write the Swift plant nearest you.

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Let These Ten Elements Help You Make More Profits

Manganese — for healthy growth
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NO FILLERS NO WASTE

More Mineral for Your Money

The
CLIPPER ROCKER

Introducing

AUTOMATIC
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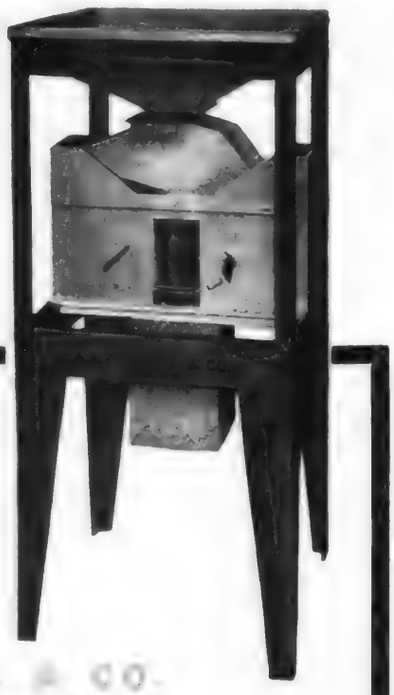

Ideal for your modern farm, this is the Treater you'd build for yourself for dry chemical treatment of beans, grain and seeds.* Easily operated by gravity, *no power is required.*

And . . . this handsome, reliable machine sells for only $75 net, F.O.B. Saginaw. Write today for circular, or send check for immediate delivery.

*(will not handle undelinted cotton seed)

A. E. PERRETT & CO.

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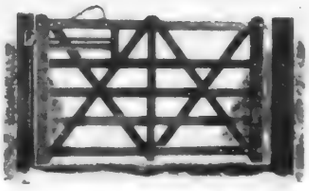
FENCES FOR EVERY PURPOSE

WOVEN CLEFT PICKET
Pickets are woven together with wire. This leaves ¼" space between pickets and permits passage of sunlight and air



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Protect valuable live stock from dangers of straying and damage to property. Gate locks automatically with push from either side. Ideal for horseback riding

POST AND RAIL
Made of selected hand-split Chestnut. This fence is available in both the 3 and 4 rail types. A strong, beautiful, long-lasting, all-purpose fence.

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Two sizes—3 ft. high for small homes, 4 ft. high for farms and estates. Made of selected timber. Assembled and shipped in panels 8 ft. long. Easily erected

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TIGHT SCREEN AND WOVEN PICKET • ENGLISH HURDLE • POST AND RAIL
FARM GATES • HORSEBACK AND SELF LOCKING FIELD GATES
CHILDREN'S OUTDOOR PORTABLE PLAY PENS

Stock Auction

(Continued from page 27)

at the Scioto auction, not all individual sales are spectacularly large ones. Occasionally the audience is treated to a belly laugh when some heckler's two-bit bid for a sway-backed bull is snapped up by an auctioneer who presents the purchase with a rare show of courtesy.

As a rule, however, the prices paid for livestock at the Scioto auction are uniformly high. One reason for this is the proximity of competitive slaughterhouses whose buyers are blessed with ever ready check books. Another, and perhaps more important reason, is the quality of the livestock offered.

THE Scioto river valley has been famous for its fine-bred livestock ever since the first imported cattle in the Northwest Territory were driven into the rich bottom lands on the heels of retreating Indian tribes. English-bred cattle thrived on the lush blue-grass meadows and the pioneers quickly increased their herds. In 1804 the first western cattle ever taken to an eastern market were driven across the mountains to Baltimore. From that day on the stock business grew and the fame of Scioto livestock was spread by lusty Ohio drovers from the Bull's Head Tavern in New York to the staked plains beyond the Mississippi.

Although Scioto valley farmers have lost none of their forefather's interest in fine-bred livestock, it is not this interest alone that brings them to the weekly auctions. Here, as in hundreds of other cities and hamlets, farmers who make only an occasional purchase or sale attend the auctions regularly. Ask a typical auction-goer what brings him to the auction when he has no intention of buying or selling livestock and you will receive a vague grin:

"I dunno. Auctions—well, they're just interesting."

They are that and more. Perhaps the real reason why most farmers attend is to be found in the casual bits of conversation that pass between them.

"Hear you're lookin' for a manure spreader, Cory. I've got one I'll sell."

"Hog prices won't bust down this year. Leastwise, I'm figgurin' they won't."

"Know where seed corn's to be swapped for gilts, Tom?"

"I'm sayin' I took two swallers of horse liniment and it cured my cramps."

To a large extent, too, auction day has supplanted the traditional Saturday trading day. Much has been accomplished by the time the farm family heads for home in late afternoon or early evening. Mom has done the week's shopping. Dad has swapped off some fence rails for seed potatoes. Jim, the oldest boy, is already figuring out a new 4-H project to finance with the money he received for his feeder calves at the auction. The kids have seen a cowboy movie and have enough candy left to provide a new bellyache tomorrow.

(Continued on page 132)

Lead the Production and PROFIT Parade!

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Pig & Hog Supplement
Special Pig & Hog Supplement
Poultry Supplement
Dairy Supplement
All Mash Poultry Starter
Growing Mash
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PHENOSALT

Get livestock and poultry off to a flying start and lead the profit parade to early market with stock that brings top prices!

Feed ALL THE WAY—WITH NU-WAY . . . the feeds made by animal nutrition specialists. All are feed lot tested and PROVED — pack EXTRA vitamin and mineral PUNCH.

Build outstanding fall and winter rations with Heinz NU-WAY Supplements and minerals, or be first to market with complete Heinz NU-WAY formula feeds. See your nearest NU-WAY Dealer TODAY!

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IMPROVE YOUR HERD BLOODLINES

WITH

Chardon Farms Breeding Stock

Leading one and two year old Hereford bulls and heifers from W-H-R and Thornton strains.

Champion, show, golden Palomino horses and mares.

CHARDON FARMS

Registered Herefords — *Palomino Horses*

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GOOD NEWS FOR FARMERS!

SPECTACULARLY IMPROVED
SEAMAN Triple TILLER

Make a better seedbed . . . faster! . . . with a Seaman Farm-Size Triple Tiller. With a single implement, you can prepare a complete seedbed in one operation under average conditions. Handles shallow or surface mulching, or deeper tillage, as required. Fertilizer or surface vegetation is thoroughly milled into seedbed. Promotes increased yields, eradicates quack-grass, provides better weed control.

NEW, SPECTACULAR IMPROVEMENTS INCLUDE: Drastic reduction in horsepower requirements, permitting successful operation of a 3-ft. Seaman Tiller from power take-off of top-rated 2-plow tractors; wheel position (in front) eliminates tiller wheel tracks; new type Pilot Disc assures better operation in average cover crops; new type tines permit more effective penetration; greatly improved Rotor Assembly, with heavier carrier plates and long-life clutch facings, assures drastic cut in maintenance costs.

All the above PLUS VALUES now available AT NO INCREASE IN PRICE! And here's MORE good news! Increased production makes power take-off model SEAMAN TRIPLE TILLERS available NOW!

PRICE: 3-FT. MODEL $525 f.o.b. Milwaukee

SEE YOUR LOCAL IMPLEMENT DEALER ABOUT A SEAMAN TILLER AT ONCE! or write us for detailed information.

DEALERS: If we are not represented in your locality, write, phone or wire for details regarding the Seaman Dealer Franchise.

SEAMAN MOTORS
350 NORTH 25th STREET, MILWAUKEE, WIS., U. S. A.

173-174-175

Wise motorists avoid tire breakdowns and back-breaking work by making sure their tires are inflated to proper pressures *at all times*, and, of course, it's only common sense to keep the air in. Have your tire valve cores inspected now. They may be old and ready for renewal. Your dealer has a supply on hand.

Schrader Cores
MAKE TIRES LAST LONGER

STOCK AUCTION

(Continued from page 130)

Back in town, merchants are making notes of the day's best-sellers and planning next week's auction day specials. Packers and buyers are silently congratulating themselves as they tally up their day's purchases; or mentally kicking themselves if their luck ran bad.

The Scioto Livestock Company, like hundreds of other auction plants that have won confidence through fair treatment, is proud that many farmers hire truckers to bring their livestock to auction during the busy season. Bill McGinnis, acting president of the company says: "It's our job to grade livestock carefully, check and recheck weights, and keep an accurate record on each animal from the minute it is accepted at the plant until it is loaded out on a new owner's truck. When we do that we are protecting the interests of both farmers and buyers."

Not all auction operators enjoy the confidence of farmers and buyers. Let's examine a few of the practices objected to most strenuously by farmers, buyers, and reputable auction operators alike.

Misrepresentation of Livestock: This can be verbal, as in describing a mare as "safely in foal" when she hasn't dropped a colt in years. Or, avoiding *verbal* misrepresentation, livestock can be "flashed" through the arena so quickly and with so little workout that prospective buyers are unable to detect an animal's flaws. Sometimes a calf is run into an arena just long enough to create the impression that it belongs to the cow with it, although the cow is dry. In other instances, cattle are "doctored" with a salt and sugar solution to give them spirit before being brought into the ring.

Reputable managers and auctioneers are careful in the matter of accepting animals for auction. If, in spite of their precautions, an animal whose condition they suspect gets into the ring, they warn prospective buyers with such phrases as "at halter" or "as is."

Favoritism: Many farmers and buyers have reason to complain of the favoritism shown at some auctions to cliques of buyers. These buyers, insisting that they must be allowed "to feel the animals" in order to judge their condition, are given seats in the arena itself. As an animal is driven into the arena they collect around it in such a manner as to block the view of other buyers until they have filled their own quota. The non-privileged customers rarely have an opportunity to bid on quality animals.

Company Jackpots: Ocasionally auctioneers and operators work in cahoots with groups of buyers to create livestock "jackpots." A "jackpot" animal is obtained when the auctioneer makes a quick, cheap sale to a member of the clique. Then, when bidding is brisk, the same animal is brought

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back to the ring, sold at a considerably higher price, and the profits are split between the auctioneer and the clique members.

Floaters: Traders sometimes specialize in buying "floaters" or counterfeit stock which they move from one auction to another until some inexperienced farmer or buyer bids more than the "floater" is worth. The new owner is then stuck with a stale or sick or inferior animal.

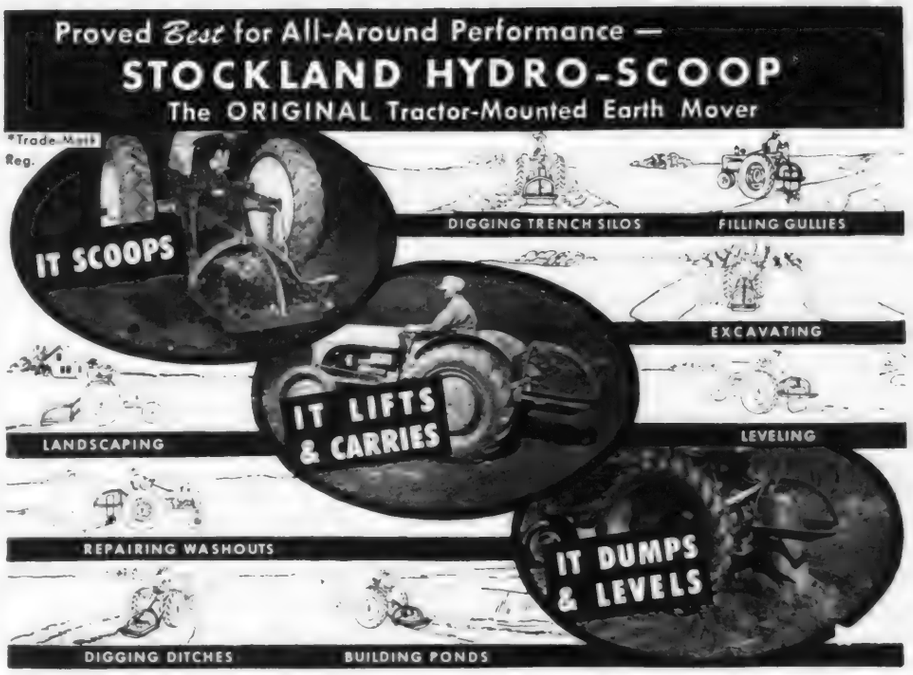
Lay-off Bidding: Organized cliques of buyers "lay-off" bidding on a farmer's consignment until the animals can be purchased cheaply. Then, with the ownership of the stock divided among them, they bid up each other's offerings until an opportunity arises to unload upon an outsider. A variation of this trick is to locate an outside buyer who is trying to make up a carload of stock. The clique buyers permit a few head of stock to be sold to the outsider at a reasonable price, then begin bidding high themselves, forcing him to pay a premium on the rest of his load.

By-bidding: Though far less objectionable than the other practices described herein, "by-bidding" is discouraged at most reputable auctions. "By-bidding" is an attempt of a livestock owner to do one of two things—to run up the price on his own stock, or to get an estimate on the value of stock he has no intention of selling. Since it is an easy matter for a stockowner to have a friend bid for him at auctions where by-bidding is forbidden, some auctions permit an owner to cry "No sale!" when a price is unsatisfactory. To discourage this, a fee is charged for either by-bidding or no sale transactions.

The conditions under which auctions may operate vary with the statutes of different states. In most states the trend is toward closer state supervision which, in conjunction with the growing strength of reputable auction plants, has a tendency to choke out some of the concerns that practice shady (though oftentimes legal) dealings. It is doubtful, however, that this choking out process will ever be fully successful until auction operators are themselves welded together in a national governing body, empowered to standardize auction procedures and eliminate bad practices through enforcible controls.

Livestock auctions will continue to flourish despite a thorny minority of unethical concerns. The most comprehensive survey thus far completed indicates that three out of every four livestock producers throughout the country patronize the auctions in their vicinity. An overwhelming majority of farmers agree wholeheartedly with a rural Collector of Internal Revenue who said recently:

"Livestock auctions? Well, Si, I would say that the auctions are the best damn things that ever hit the country—for farmers and packers alike!



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1 to 10 head inclusive	$ 1.00 per head
Over 10 head (Min. 10.00)	.85 " "
Car lots (Min. weight 23,000 lbs.)	20.00 per car
Bulls from 400 lbs. to 600 lbs. inclusive	1.00 per head
Bulls over 600 lbs	1.50 " "
Cow and Calf	1.50 " "
HOGS	
Hogs 100 lbs. and over, 1 to 50 head inclusive	.25 per head
Over 50 head (Min. of 10.00)	.20 " "
Pigs under 100 lbs	.20 " "
Boars	.50 " "
Sow and Pigs	1.00 " "
CALVES	
Under 400 lbs. 1 to 20 head	.50 per head
Calves under 400 lbs., 21 to 50 head (Min. 10.00)	.40 " "
Car lots (when sold as such) Over 50 head	20.00 per car
SHEEP, LAMBS AND GOATS	
1 to 25 head inclusive	.25 per head
26 to 100 head inclusive (Min. of $5.00)	.20 " "
Over 100 head (Min. of $20.00)	.18 " "
HORSES AND MULES	
Horse selling over $30	2.00 per head
Horse selling under $30	1.50 " "

Animals selling for a total of less than $2.50 a flat charge of 10 cents will be made and considered commission and yardage.

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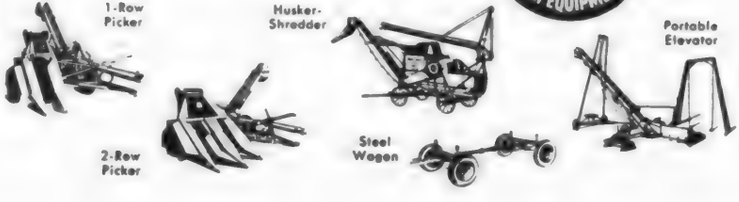

BANG'S DISEASE

(Continued from page 32)

There Are Accredited Herds

Under federal-state programs of brucellosis control in cattle, many states have authorized official brucellosis-free accredited herds. Generally speaking, an accredited herd is one in which no reactors have been encountered in two annual tests or three consecutive tests at six month intervals. In herds where calfhood vaccination is being employed, temporary reactions due to vaccine are disregarded. Animals that do not clear up at 30 months of age are regarded as reactors and are removed from the herd. Accredited herds are generally tested annually in order to maintain their standing.

A Sandusky, Ohio, farmer whose herd is Bang accredited writes:

"I wish I could give you a definite answer on whether a farmer should have his stock vaccinated. It's an expensive business, and like any form of insurance, you have to make some sacrifices in order to build up a gain. Here's what happened to me.

"My neighbor was wiped out with Bangs. Twenty beautiful Brown Swiss—all sent to the slaughter house. All registered stuff and worth better than $350 a head. He got about $130 for each and of course has to start all over again.

"Well, his wife cried all over our kitchen, and my wife got so scared about what happened to them that we wrote in to the State to see about our herd being accredited for Bangs.

"First we had to pay to have the herd Bang tested. That costs from $1 to $2 a head depending on how well you bargain, and you have to do it once a year. Second you must get every calf vaccinated at 6 months. If it's too old or too young, the vaccination doesn't count. So it's one more record to keep. And of course the farmer has to pay for vaccination. That is three bucks per calf. Our vet here is new and has so much business I couldn't talk any sense into him, and we paid $3 per calf. We vaccinate only the heifers.

"I thought that was the end of it. But NO. About once every three years at our farm (24 milking cows) one of the heifers that is vaccinated becomes what they call a 'reactor'. In other words, the vaccination gave her Bangs and she can't throw it off. Naturally that only happens to your best heifer. So the inspector ordered a retest. Another 3 bucks. Then if it still reacts, the animal is condemned and you must have it slaughtered for which you get the regular meat price wherever you ship it. Then you have to clean out whatever section of the barn you held the heifer in. After it's cleaned out good, you file a claim for the animal because you are part of the Bang vaccination program. You get more if the animal was registered—not a certificate of birth, but actual registration papers. Of course, you don't *have* to slaughter it; you can isolate it and hope. But who wants a possible source of Bang infection plus all the trouble of an isolated pasture, hauling water for one cow, etc.

"A state inspector valuates the heifer but you can't grab anything off here. The top they pay is $100 above the meat price. The State and Federal Government each pay half. As I see it, the whole bang vaccination program is only a matter of your signing up to have a 'policeman' force you to spend money to test your cows annually for Bangs, and to vaccinate your heifers. Otherwise maybe, you wouldn't do it.

"I, for one, wouldn't do it.

"So I signed up with the program and it costs me about $100 a year for vaccinations and Bang testing, and extra time to keep records; and out of it I get $75 once every three years, and I lose a heifer that maybe otherwise I would not have lost. But I DON'T HAVE BANGS—so until they find something better I'll stay with the program."

Indiana: Recent legislation provides for control under four plans: PLAN 1: Test and Slaughter with indemnity; PLAN 2: Test and slaughter with indemnity, including calfhood vaccination; PLAN 3: Test and segregate, with or without calfhood vaccination and no indemnity; PLAN 4: Vaccination of adult cattle and calfhood vaccination without indemnity. An appropriation of $100,000 for indemnity each year, paying up to $25.00 on grade animals and up to $50.00 on pure bred animals, and paying nothing for grade males was approved. The drawing of the blood samples is done by the local accredited veterinarian throughout the state, the owner paying for such service. Tagging, branding, and appraising under Plans 1 and 2 is done by men working out of the State Veterinarian's Office and the B. A. I. Office. This work is all cooperative with the B. A. I. and are only recognizing herds signing the plans.

Kansas: At present the control of brucellosis is confined to herd testing and slaughter with a view to accreditation of the herd. The state will adopt a program of brucellosis control in the very near future which will include (1) test and slaughter with a view to accreditation; (2) test and slaughter with calfhood vaccination; (3) test of the entire herd six months of age and over, removal of reactors, and vaccination of the entire herd; (4) test of the entire herd, vaccination of all negative animals 6 months of age and over, calfhood vaccination, and retention of reactors—all reactors, wherever found, will be quarantined on the premises until such time as they are removed for slaughter.

Kentucky: The control of brucellosis is conducted as a federal and state coopera-

(Continued on page 136)

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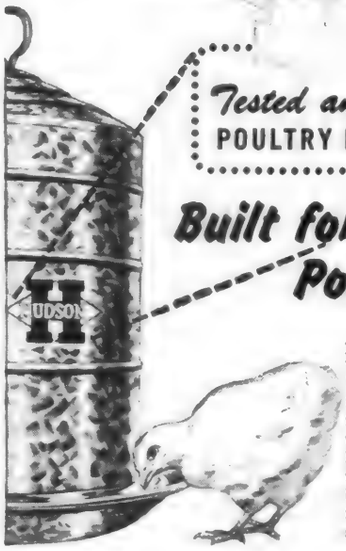

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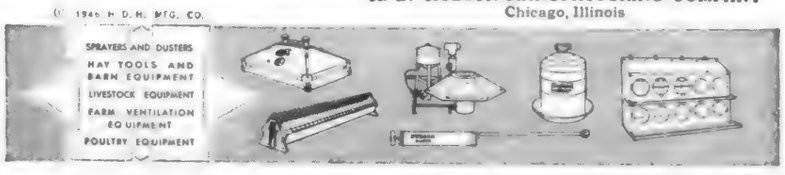

BANG'S DISEASE

(Continued from page 135)

tive project. There is no legislation governing this measure on an area basis, all work is voluntary upon the part of herd owners, and is always under the supervision of the cooperating agencies. The services of practicing veterinarians are utilized in the process of accrediting and reaccrediting accredited free brucellosis herds. There are three procedures that may be followed in the Cooperative Program: (1) Herd testing and slaughter of positive animals to attain accreditation and maintain same; (2) Herd testing with slaughter of positive animals and calfhood vaccination; (3) Herd testing with retaining positive animals under quarantine, releasing such animals only for slaughter and calfhood vaccination.

Iowa: State control follows three plans. First, test and slaughter. Second, test and slaughter with calfhood vaccination. Third, test and retention of reactors with calfhood vaccination. Whether or not an owner submits his cattle for test is purely voluntary. However, the cost of the testing is at public expense and indemnity is forthcoming should reactors be revealed. Indemnity prevails only where the owner signs a cooperative agreement and is concerned with the eradication of the disease. In case private tests are run to meet certain requirements, no indemnity is paid.

Ohio: Control is based in three plans as follows: (1) This is the blood test and slaughter plan with indemnity. This plan will be continued so long as indemnity funds are made available for the payment of reactors that are slaughtered following an appraisal. (2) The combination of Plan 1 (blood testing with indemnity) and calfhood vaccination constitutes Plan 2. Under this plan the owner will be eligible to have his cattle blood tested subject to indemnity if vaccination is limited strictly to calves from 4 to 8 months old. The law in this State prohibits the payment of indemnity on any cattle that received brucella abortus vaccine when they were more than eight months old. (3) Under this plan, blood testing is combined with the vaccination of calves between 4 and 8 months old. The reactors are identified and marked as required by law, but the owner has the privilege of retaining his reactors for deferred slaughter. Reactors will not be appraised and no indemnity is paid under this plan.

Oklahoma: In cooperation with the bureau of animal industry, the state is working under the following four plans. First—Plan A is a testing and slaughter method under which all reactors are removed and slaughtered. Second—Plan B is an agreement whereby all reactors are removed and slaughtered and the calves are vaccinated. Third—Plan C provides for calfhood vaccination, permitting the owner to hold the reactors on his premises. Fourth—Plan D is testing of cattle

and vaccinating all calves over four months of age and also the vaccination of all age animals negative to bang test.

Nebraska: The brucellosis control law, which was passed in 1939, is soon to be amended. At present it is a straight test and slaughter program. A new bill before the Legislature will amend the brucellosis law to include official blood testing, slaughtering of reactors within fifteen days, or the herd owner may elect to retain the animals in the herd for feeding, grazing or even breeding purposes without benefit of indemnity and to be sent to slaughter when they are no longer profitable. It will also include calfhood and adult vaccination. It will require all vaccinated animas to be identified and reported to this department, as officially vacinated animals.

West Virginia: Three plans are in operation: No. 1—Test and slaughter. No. 2 — Test, slaughter and vaccinate. No. 3—Test, segregate and vaccinate. The ultimate goal is county accreditation, which has been accomplished in thirty-two of our forty-five counties, which were our most heavily infected counties, with the exception of possibly three counties. Plan No. 1 was the most popular until recently. Plan No. 2 is now meeting with the greatest success, particularly in the large herds. Plan No. 3 is being applied only in the so-called problem herds, of which there are only a few.

Michigan: Official brucellosis control work in Michigan is largely confined to the upper part of the state where area eradication work is under way in 42 of the state's 83 countries. Thirty of the 42 counties have now qualified as modified accredited areas—the infection has been reduced to less than one per cent. Also, under direct Federal and State supervision the test and vaccination plan is being followed on a township basis in three additional counties. Here the owner is not required to immediately slaughter his reactors and the calves in the infected herds are vaccinated. In lower Michigan the testing of bang's disease is conducted almost entirely through local approved veterinarians who submit blood samples to the central laboratory for test.

Minnesota: State control follows three plans: (1) Herd testing and slaughter of reacting animals; (2) Herd testing with slaughter of reactor animals plus calfhood vaccination; (3) Blood testing of the entire herd with retention of the reactor animals and calfhood vaccination and a quarantine of the reactor animals with the understanding that they will be slaughtered as soon as they can be replaced with animals that were vaccinated as calves. The State has 22 counties that are certified as bang's free, disease free, territory.

Pennsylvania: Four methods are in operation as follows: 1. The test and immediate elimination by slaughter of re-

(Continued on page 138)

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BANG'S DISEASE

(Continued from page 137)

actors with indemnities (Individual and Area). 2. Plan "A"—Test and immediate elimination by slaughter of reactors with calfhood vaccination and indemnities. 3. Plan "B"—Test and gradual elimination by slaughter as reactors become unprofitable, with calfhood vaccination and without indemnities (Individual Plan). This method is permitted in herds in modified quarantined bang disease tested areas; but it is necessary that transfer be made to the Individual Plan, if the owner desires to adopt calfhood vaccination. Under this plan the owner employs his veterinarian to conduct the vaccination after obtaining a permit from this Bureau. 4. Plan "C"—Calfhood vaccination without blood test of mature animals. Mature animals are to be slaughtered as they become unprofitable and as vaccinated animals have been raised to serve as replacements. When the herd is replaced with vaccinated animals, the owner may adopt Plan "A" or "B". Plan "C" is conducted under official supervision in accordance with a special agreement and permit issued for the use of Brucella Abortus Vaccine.

Missouri: For the suppression of brucellosis the state has only one official plan recognized at the present time, and that is herd testing and slaughter of reacting animals This work is carried on in cooperation with the Bureau of Animal Industry the same as in other states.

New York: Two plans are available to cattle owners under the official brucellosis control program. Services are provided upon request through local accredited veterinarians, without expense to the owner. Plan A provides for annual herd blood testing and vaccination of calves as they can be grouped between 4 and 8 months of age. Recognition as "Vaccinated and Approved" is provided when herd blood test results and physical record indicate freedom from infection. Plan B provides only for vaccination, identification and recording of calves. This procedure is recommended as an initial approach to the control of brucellosis in badly infected herds. Owners are encouraged to transfer to Plan A and benefit from herd blood testing as an aid in the culling process, when vaccinated heifers become available as replacement animals.

Wisconsin: A new law provides for an extensive control program of testing, segregation, vaccination, quarantine and recording. To be entitled to an accredited herd certificate the herd owner may be required to execute and file an agreement: (a) To keep adequate records of cattle owned, added to and removed from the herd; (b) To submit to an entire herd test upon demand by the department; (c) To report promptly any abortion in the herd and any other evidence of possible infection; and (d) To do such other things as the division may deem necessary on the part of the holder of such certificate.

WHY THE CONFUSION ABOUT BANG'S DISEASE CONTROL?

Dr. C. R. Donham, chief veterinarian at Purdue University, has led a determined crusade for the control of Bang's Disease. Following is a brief analysis of his views on control.—

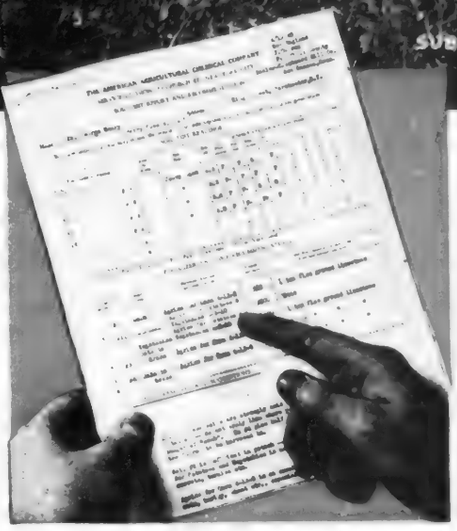
Farmers are badly confused about Bang's disease, the number one disease handicap of the cattle business and an important cause of ill health among rural people. They read an article in a good farm magazine one week that says one thing and the next week they read another article in an equally good farm magazine that says something entirely different about the control of Bang's disease. The result is that farmers are so badly confused that they don't know what to believe.

Most of this confusion is not in the science. Scientists know a lot of things about Bang's disease. This knowledge has been acquired through many years of research all over the civilized world since before the turn of the century.

Much of the confusion will vanish when the cattle industry of America decides what it wants done about Bang's disease and makes its demands in unmistakable terms.

A former state highway commissioner heard a discussion on Bang's disease control and drew an analogy. He said, "Veterinarians have the same problem as I had when I was a highway commissioner. People came to me with tears in their eyes because we proposed to put the road straight through to the state capitol instead of following the old crooked, horse-and-buggy trail past their filling station or cabin camp." The question, then, remains for the cattle industry to decide whether it wants the highway built straight through to the state capitol or whether it prefers to try to go past each diseased herd and do the best job possible for it, which at best will only be makeshift and temporary.

In addition, legislators must have the courage to adopt a scientific eradication and control program. They must be immune to the pressure from short-sighted owners who would rather hold on to their diseased herds than to sacrifice now for future benefits. There should be uniform state laws or a federal law designed to regulate the whole cattle industry. Unless the disease is eliminated from the entire country there will be little progress. Bang's disease shows no respect at all for an imaginary line on a map.



To help you get the most out of your fertilizer investment, let us test your soil and give you a soil analysis report, with recommendations as to the fertilizer and lime needed to produce best results for the crops to be grown. This service is free . . . no strings tied to it. Write our nearest office, listed below.

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Remember, there's an Agrico Fertilizer specially formulated for each crop and for soil and growing conditions in each important crop-producing area. Use Agrico on your crops this season and see for yourself the difference it can make in yield and quality.

LET US *Help you* GET BETTER CROPS

Acute feed shortage emphasizes the importance of more and better home-grown grains, hay and pasture, and suggests the wisdom of liberal fertilizer applications this Fall. What kind of fertilizers, and how much to apply? The sound answer must come from the soil itself. If you are not sure of what your soils need for maximum production, or if you have other soil problems, take advantage of our Soil Service. Write our nearest office, listed below, and we will make a thorough soil analysis and give you specific recommendations for the crops you plan to grow. This service is backed by long experience — hundreds of thousands of tests for farms, large and small, which have invariably helped improve crop production.

FALL FERTILIZATION IMPORTANT

In seeding wheat with grass or legumes, remember that it takes plenty of plant food to supply the full requirements of both crops — so use a liberal application of AGRICO FOR WHEAT or AGRICO FOR GRAIN, the complete fertilizers formulated to produce quality yields and also give the following hay crop a good, vigorous start.

Also bear in mind that Fall's the best time to top dress pastures and haylands. For bigger yields of hay, higher in protein and minerals . . . for earlier and better grazing next season . . . top dress with 18% *NORMAL* Superphosphate any time before the ground freezes. For legumes, use AGRICO PHOSPHATE & POTASH . . . for still more intensive fertilization, AGRICO FOR TOP DRESSING will pay you well.

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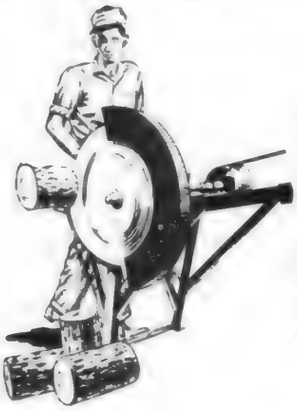
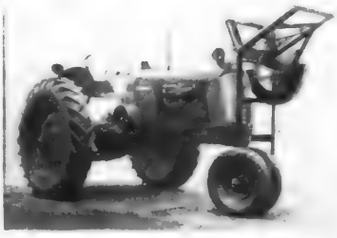


Have cutting power wherever your tractor can go!

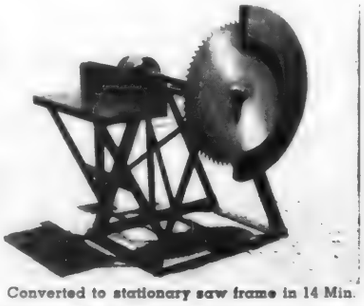
Unaided, you can quickly mount this portable cordwood saw on any popular make tractor and drive it directly to the woodpile. Then drop the front frame legs to the ground . . . and you're ready for action. No more dragging unwieldy logs through wooded lands. You can cut them to size on the spot.

Or detach your saw from the tractor, shift two bolts, and you have a stable, stationary saw frame. Designed to operate on as little as 5 h.p., this cordwood saw gives you the versatility plus the dependability you expect from New Holland Farm Engineered equipment.

Write Department N-8 for full particulars.



Model 200 Cordwood Saw in carrying position



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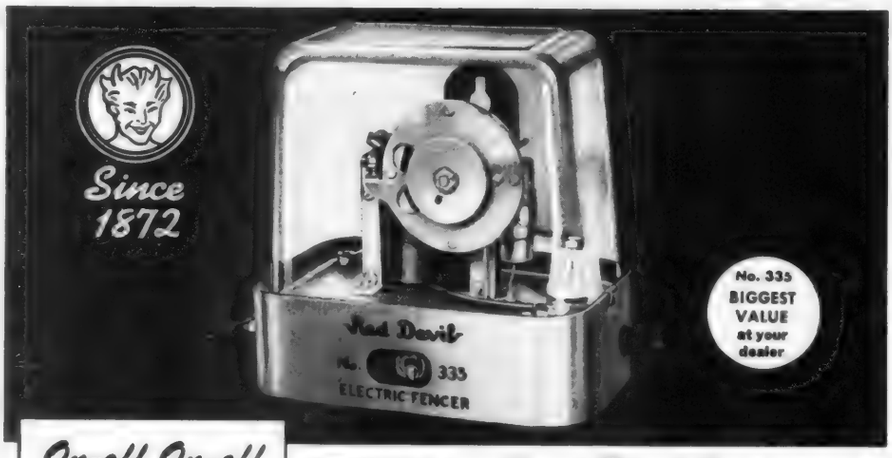

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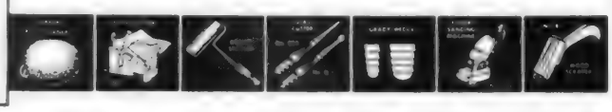

HONEY IN THE COMB

(Continued from page 63)

perature within a hive will be maintained at 75 to 85 degrees F. even though the mercury drops to several degrees below zero outside.

Nectar Producing Plants

The color and flavor of honey depends upon the species of plants from which the bees obtained their nectar. Some people prefer light honey; others relish the slightly heavier flavors of the darker shades of honey. As a rule the honey produced from white alsike and sweet clovers is taken as a guide for the finest qualities of market honey. Honey from these plants ranges from almost water white to a light straw color.

Honey from black locust, when produced in quantity, is of excellent flavor and is also light in color. Smartweed honey is light amber in color and has a little heavier flavor than clover honey. Buckwheat nectar produces a dark, almost black, honey that shows a reddish cast when held to the light. It is heavy in flavor but extremely popular in some parts of the country. Aster and goldenrod honey in late summer produces an amber honey that has a tendency to crystalize rather quickly. In between these more or less standardized colors and flavors are many intermediate shades, all dependent upon the predominating plants in the vicinity of the hives producing honey.

Bee Diseases

Though adult bees are sometimes afflicted with dysentery, paralysis, spray poisoning, or Nosema-disease, the worst enemies of bees are the brood diseases; namely, European foulbrood, American foulbrood, and Sac brood.

European foulbrood and Sac brood, if detected early enough, can usually be cured by re-queening with an Italian queen. The dread American foulbrood has no known cure. Once it has made a start in a colony the only known solution is destruction of the infected bees and their materials by fire.

Since disease control with bees is essentially a preventative rather than a curative problem, the beekeeper's best protection is a thorough understanding of the natural development of brood. At the first indication that a colony is decreasing in population he should inspect the brood in search for a cause. If the adult bees have torn the capping off the larvae cells and a deposit of coffee-colored material remains beneath them, he may take it for granted that the larvae are dead. This calls for some quick action on his part, for bees from healthy colonies are likely to begin stealing honey from the weakened colony—thus spreading the infection if foulbrood is present. Whenever in doubt about a colony it is best to play safe by contacting the local bee inspector who will make an examination and determine the cause

(Continued on page 142)

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WEED FARM TRACTOR CHAINS produce the traction that keeps your rubber tired tractors rolling when the ground is too wet without them.

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AMERICAN CHAIN DIVISION
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In Business for Your Safety

LEAN AND EFFICIENT

(Continued from page 75)

should be accessable in all corn belt states."

W. F. Glaeser, Gibbon, Minn., says, "I'm not trying to make a sales talk but I believe in them. I only wish I could devote all my time to working with Minn. No. 1 hogs." Royal W. Jackson, Camp Point, Illinois, received the following comment from a packer who dressed out a number of the new hogs: "I could notice a difference in the meat of this hog over the average hog that we receive at the plant in the following manner: After running the hog in the cooler, the meat seemed to firm up faster which may be due to what you fed the animal. Also the lean meat of the hog has a nice color and is scattered through the cuts of the animal very well. What I mean by this is that the sides had a streak of lean and a streak of fat which makes a good bacon hog."

Breeders are likewise from Missouri, especially those who are deep in the lore and performance of the older breeds. Says Will Brown, of Hoosier Acres, Bloomington, Indiana, who raises and breeds O. I. C. champions. "We are breeders of registered O. I. C. and Berkshire hogs. For commercial use we have cross bred them, so that we might get lean meat with very quick growth. We have no criticism to offer on the claims of Minn. No. 1, other than we have always found it hard to get quick growth without getting fat. I can't see that it will make a great deal of difference, because much fat will be needed for soap and other uses and in my opinion decreasing the fats would only mean that we would have to go to something else other than hogs for our fats."

Some old line hog men think the claims for the performance of the new hogs are extravagent. Among them is Walter E. McCoy, of Bainbridge, Indiana. Mr. McCoy, a member of the National Record and Spotted Poland China breeder, says, "I must say the claims of Minn. No. 1 for economy of feed in producing pork seem fantastically extreme. I think you can readily see that after 26 years of breeding pure-breds I am not likely to be too much interested in a new breed. I am fully aware of what will happen when lard is again in surplus, and am breeding a type of meat hog, not the extreme lard type that is so popular in a large section of the country today, but the average farmer will insist on a type of hog with some roundness of body."

Perhaps geography is to blame, but the efforts of the Producers Livestock Association at Columbus, Ohio, to introduce Minn. No. 1 to Ohio growers met with scant success. The Association bought several animals of the Minn. No. 1 strain in the fall of 1944 for a test in this section. They bought both boars and gilts and used them straight and crossed. Walter Sollars, Washington C. H., one of the directors, reports that the results were not to his liking. The pigs raised did not do as well as native pigs, were somewhat susceptible to disease, and did not produce a very uniform lot. The Association called in the boars and discontinued the test.

The breeders' associations are taking the new hog with more than a grain of salt. They are finding it difficult to swallow the claims that Minn. No. 1 will outgain good purebreds and naturally are slow to be convinced that anything beats a purebred in all departments. B. R. Evans, secretary of the Duroc Association, believes the Minnesota people have not progressed far enough to back up their claims about cross breeding and he would like to see an impartial test on the relative gains made by Minn. No. 1 and purebreds. As for the possibility that lard will be a drug on future markets, Mr. Evans says, "It seems to me that a great deal can be done in finding a market for lard, which is a tried and proven product, rather than to try to dig up another breed of hog, which, if fed corn as they are in the Cornbelt, will naturally revert to the same kind of hogs as we have now."

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HONEY IN THE COMB

(Continued from page 140)

of any abnormal condition that may exist.

American foulbrood attacks the developing bees shortly after the larvae has sealed over its cell in preparation for changing into an adult bee. European foulbrood attacks the larvae when it is still quite small and curled up in the bottom of the cell. When the larvae dies from European foulbrood it has a grayish cast and can easily be removed from the cell.

American foulbrood and Sac brood are often confused. The distinguishing difference between them is that the dead larvae from American foulbrood cannot be removed from the cell due to skin ruptures which adhere tightly to the cell walls. Sac brood, on the other hand, is easily lifted out of the cell and can be recognized by a sac filled with watery fluid which has an odor similar to that of vinegar.

The Honey Pay-off

How much honey a colony of bees will produce depends upon many factors, two of the most important being the weather conditions during the honey flow, and the abundance of nectar bearing plants in the vicinity of the hives. Bees have been known to travel two miles or more for nectar, but a mile and a half is generally considered their maximum range. For profitable honey production, nectar plants should be available in abundance far within this range.

Sometimes during the first year a new colony of bees may not produce much more honey than they will need for their winter food supply. After the first year they will normally produce a surplus—the amount and quality depending upon prevailing conditions. Last year the average surplus honey yield per colony in North Carolina was 10 pounds; in Wisconsin it was 70 pounds; in Nebraska, 107 pounds. In most states the average annual yield of surplus honey will range between 30 and 40 pounds per colony.

Though the pollinating benefits, the production of table honey, and the hobby aspects of bee-raising are the primary interests of most beginning beekeepers, the sale of beeswax and surplus honey is not to be overlooked. Under OPA ceiling prices, strained honey was worth 15c a pound in 5 gallon (60 pound) containers. In 5 pound containers is was worth $1.11; in smaller containers it brought 28c a pound. Many small producers prefer to dispose of their surplus honey by selling it direct to consumers; others sell it to grocers at wholesale prices. A third method which appears to be gaining in popularity is that of selling either plain honey, or honey mixed with rich dairy cream, by mail order parcel post. As your volume of honey production increases, disposing of the surplus as a branded, advertised product offers limitless opportunities.

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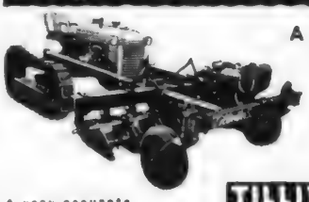

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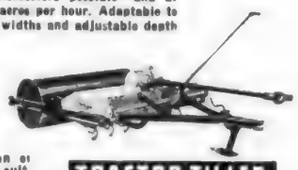

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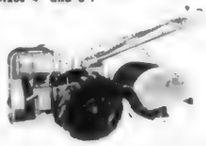

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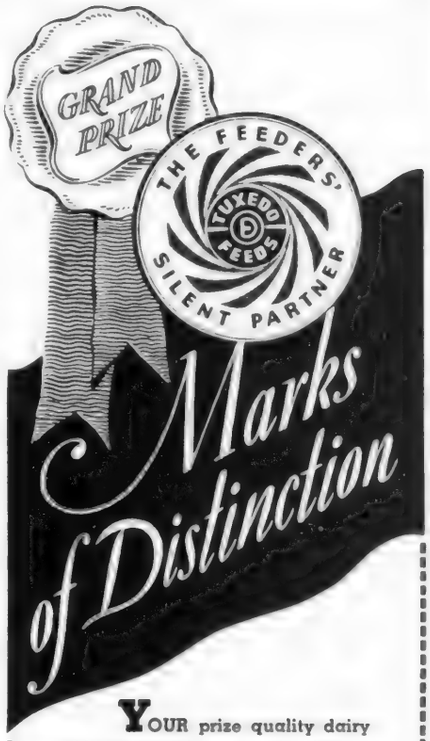

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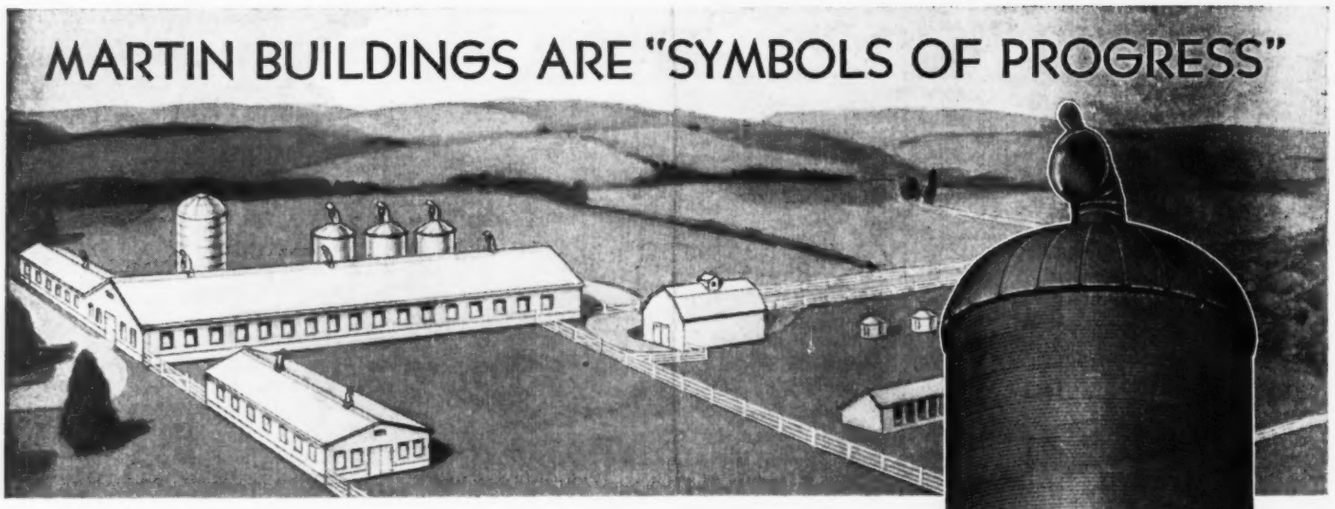

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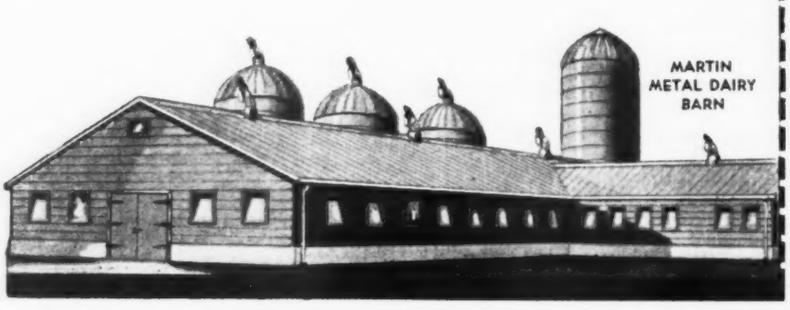

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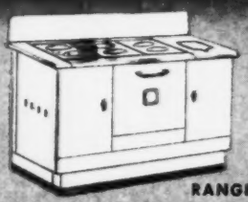
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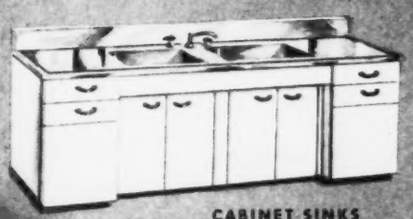
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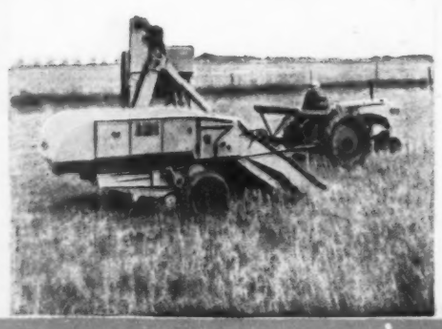

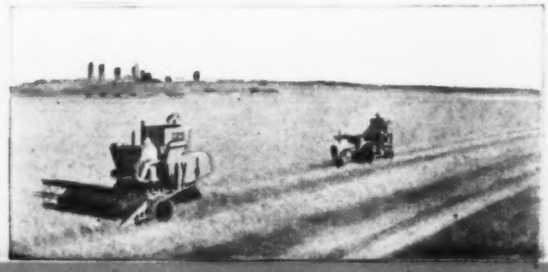

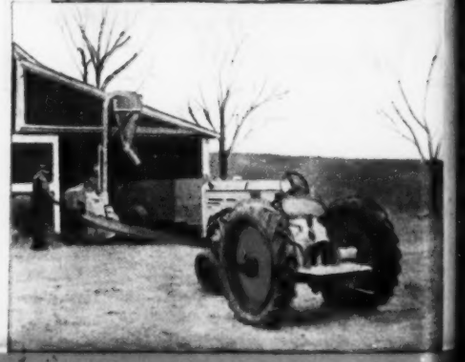

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